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ABSTRACT

This guide is devoted to development of instructional units dealing with threats to human survival. It addresses both natural and man-made disasters. Chapters include descriptions of specific threats and suggested approaches to dealing with them. Appendices present source information for films, free resource material, physical education material, resource agencies, and transparency masters. (RE)

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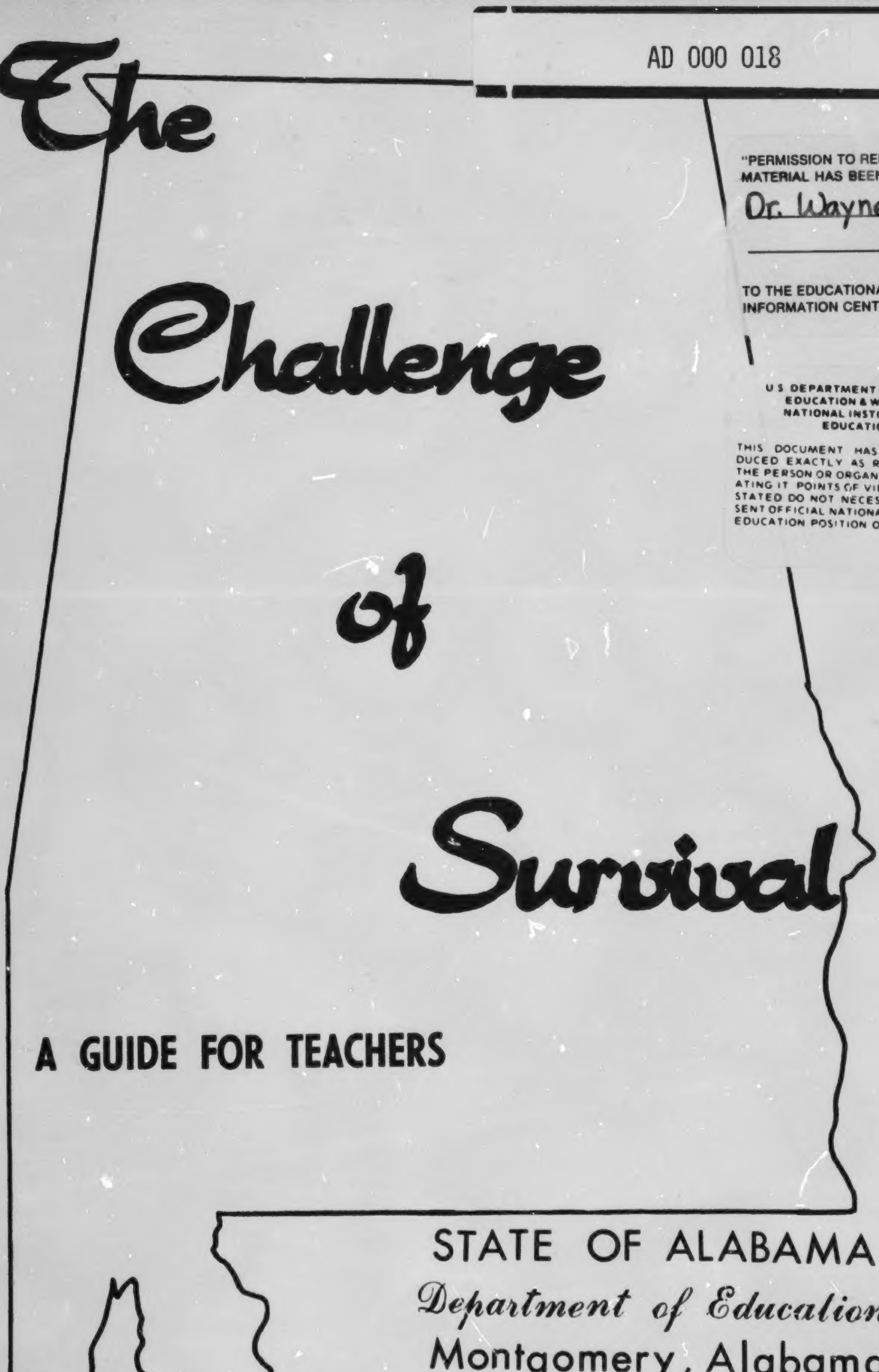

The Challenge of Survival

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A GUIDE FOR TEACHERS

STATE OF ALABAMA
Department of Education
Montgomery, Alabama
BULLETIN NO. 12
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SE 031 902

THE CHALLENGE OF SURVIVAL

A Teacher's Guide

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FOREWORD

In the very beginning of history man was concerned with survival. In some of the first examples of recorded history man was seen struggling as an individual against cave dwellers, against wild animals, and against unharnessed nature. Gradually, as centuries passed, he began to work with other people in an attempt to survive. The beginning of what we call civilization stems from this working relationship between man and man. Basic rules were then established. Customs, habits, and a way of life were beginning to take form. Man learned how to survive better by working with others. The natural environment that faced him was his greatest friend and his worst enemy. He struggled to understand it. He moved from place to place fishing, hunting, and living off the land. Nature sustained him--the forests supplied him the game, the streams the fish.

The most difficult task that modern man faces is compromise. The struggle for freedom is an inherent dream in each person. Always when the freedom of one man conflicts with the freedom of another, a battle of sorts results and one man is conquered and the other is victorious. In our society today we face some of the basic problems that are fundamental to man's concept of freedom. How do we solve our problems that relate to pollution, drug abuse, natural disasters, and the threat of nuclear war? Whatever legislation exists there will be restriction placed upon someone for the benefit of someone else. It is the purpose of the authors of this text to stimulate the student to an awareness of some of today's problems of survival.

Today everyone should recognize the need to understand problems such as land, population, air, noise, and water pollution; drug abuse; and issues that pertain to law and order. Usually, however, natural disasters such as tornadoes, hurricanes, and floods are not taken too seriously except during that moment when the disaster strikes. These problems, as well as the threat of a nuclear disaster, can be faced with wisdom and understanding--and with such wisdom and understanding, man can survive.

Wayne Teague
State Superintendent of Education

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INTRODUCTION

It is the purpose of this guide to emphasize the necessity for individual concern relative to disaster readiness coupled with an understanding of a functional government as it responds to an emergency. Since the turn of the century our government has been vitally concerned with a positive reaction to civil, economic, environmental, and military disturbances. The goal has generally been corrective, and our emphasis in the classroom has been in retrospect. It is the intent of this course to offer a program to promote survival, whatever the emergency--natural or man-made. Disaster preparedness is best accomplished when there is the desire to survive fused with a leadership that educates toward understanding potential disasters.

Inherent in this entire guide is the individual's responsibility for survival. Natural and man-made disasters present a clear and present danger to the individual and to society. Appropriate action must be planned in order to cope with an emergency which arises in our everyday living.

Government as it functions relative to everyday problems is realistic civics. Understanding the structure is essential, but comprehending the operational aspects of functional government is vital in order to assist the student in assuming a positive role relative to critical analysis and constructive performance as a citizen of tomorrow.

OBJECTIVES

The following list of objectives is designed to indicate an emphasis upon a minimum program. It is recommended that more specific objectives be developed on the local level based upon determined local needs.

Each student:

1. Gives evidence to the fact that disasters, both natural and man-made, may strike anytime and anywhere.
2. Is able to explain the role of government in time of emergency.
3. Shows an awareness of importance that individuals, families, and communities should know what to do to protect themselves in time of emergency.
4. Participates in making family plans for home and community shelter living.
5. Accepts responsibility for developing skills and attitudes needed for adapting to shelter living.
6. Shows interest in and understanding of Civil Defense organization and responsibilities--national, state, and local.
7. Displays an awareness of local Civil Defense planning for his protection.
8. Has a basic understanding of the effects of natural and man-made disasters, including nuclear war.
9. Demonstrates a concern for pollution problems.
10. Accepts responsibility for survival.
11. Exhibits sensitivity to human, [illegible] and social problems.
12. Recognizes the need for balance between freedom and responsibility.

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CHAPTER ONE - NATURAL DISASTERS

A. Introduction to study of natural disasters (Visual 1)

1. Examples of unusual incidents resulting from natural disasters
2. Personal effects resulting from experiencing natural disasters
3. Improved chances of survival resulting from knowledge and its application

B. Hurricanes

1. What are hurricanes?

   a. Definition: Tropical storms that have their beginnings near but not directly over the equator
   b. Characteristics of hurricanes:

      (1) Formation occurs over all tropical oceans except the South Atlantic.
      (2) Hurricanes are also known by other names; for example, they are called "typhoons" in Southeast Asia and "cyclones" on subcontinent of India.
      (3) Hurricanes affecting the United States have their beginnings in the Atlantic Ocean, the Caribbean, and the Gulf of Mexico.
      (4) Hurricanes usually move from west in the beginning and curve toward the north.
      (5) They usually weaken and dissipate before traveling far inland, sometimes causing severe inland floods.
      (6) Wind velocity must reach seventy-four miles per hour before it is called a hurricane.
      (7) The diameter of a hurricane may vary from 50 to 500 miles.

2. The danger of hurricanes

   a. Most powerful of storms

      (1) Property damage and loss of lives are tremendous due to strong winds, high water, and storm surges.
      (2) The nature of a hurricane (its slow movement) makes it possible to watch, predict, plan, and implement protective measures.

   b. Effects not confined to coastal areas

      (1) Heavy rainfall over the entire state may precede and follow the hurricane.

(2) Tornadoes are often spawned from hurricanes.

c. Decrease in loss of lives due to increased knowledge and advanced technology; increase in fixed property damage as coastal areas undergo further economic development (Visuals 2 and 3)

(1) Storm surges with their walls of water and receding currents (rather than winds) cause most deaths and damage.

(a) Six thousand people died in Galveston, Texas, in 1900 from the storm surge.
(b) Two thousand people drowned in Florida in 1928.
(c) Three hundred and eighty people drowned in Louisiana in June 1957 from the storm surge.

(2) The six to twelve inches of rainfall brought into an area by a hurricane produces flooding.

(a) Hurricane Diane (1955) produced killer floods in Pennsylvania, New York, and New England that claimed 200 lives and caused about $700,000,000 damage.
(b) Hurricane Camille (1969) hit the Louisiana-Mississippi coastline; but its rainfall produced major flooding in West Virginia, claiming over 100 lives and over $100,000,000 property damage.
(c) Hurricane Agnes (1972) struck the Gulf Coast, but produced rains and floods that killed more than 111 people in Pennsylvania, New York, Maryland, Virginia, Delaware, New Jersey, and North Carolina.

3. Predicting hurricanes

a. Maintenance of constant watch by Hurricane Forecasting Service of the National Weather Service, for weather conditions conducive to hurricane formation (Visuals 4 and 5)

(1) Satellites, aircraft, and radar are used by hurricane centers.
(2) Reconnaissance aircraft fly into hurricane for a firsthand look as the storm moves toward shore.

b. Storm evacuation maps available for coastal areas from Mobile to New Orleans and the Galveston, Texas, area

(1) These maps show areas that will be inundated by various tide levels and best evacuation routes.
(2) Maps are also being prepared for other areas.

c. Forecasting

(1) A hurricane advisory is sent out every six hours as soon as a hurricane is spotted. (Information given includes location, direction of travel, rate of movement, and wind velocity.)
(2) A "hurricane watch" is released when a storm is twenty-four to thirty-six hours from shore and has possibility of becoming a hurricane.
(3) A "hurricane warning" is announced when winds have reached or are expected to reach hurricane force.

(a) The hurricane is expected to move in within twenty-four hours after the first warning.
(b) Warnings are also issued with the hope of having twelve hours of daylight to take action and plan evacuation.

4. What must you do to survive?

a. Evacuate the area if possible (Visual 6)
b. If evacuation is impossible, follow these safety rules:

HURRICANE SAFETY RULES

Before

Enter each hurricane season prepared. Every June through November, recheck your supply of boards, tools, batteries, nonperishable foods, and the other equipment you will need when a hurricane strikes your town.

When you hear the first tropical cyclone advisory, listen for future messages. This will prepare you for a hurricane emergency well in advance of the issuance of watches and warnings.

When your area is covered by a hurricane watch, continue normal activities but stay tuned to radio or television for all National Weather Service advisories. If the danger materializes, a hurricane warning will be issued. Meanwhile, keep alert. Ignore rumors.

When your area receives a hurricane warning, plan your time before the storm arrives and avoid the last-minute hurry which might leave you marooned or unprepared.

During

Keep calm until the emergency has ended.

Leave low-lying areas that may be swept by high tides or storm waves.

Leave mobile homes for more substantial shelter. They are particularly vulnerable to overturning during strong winds. Damage can be minimized by securing mobile homes with heavy cables anchored in concrete footing.

Moor your boat securely before the storm arrives or evacuate it to a designated safe area. When your boat is moored, leave it and do not return once the wind and waves are up.

Board up windows or protect them with storm shutters or tape. Danger to small windows is mainly from wind-driven debris. Larger windows may be broken by wind pressure.

Secure outdoor objects that might be blown away or uprooted. Garbage cans, garden tools, toys, signs, porch furniture, and a number of other harmless items become missiles of destruction in hurricane winds. Anchor them or store them inside before the storm strikes.

C. Tornado

1. What is a tornado?

   a. Definition: Violently rotating masses of air characterized by a funnel-shaped cloud, usually stretching from the cloud layer to the ground, but not always touching the ground.
   b. Characteristics of tornadoes:

      (1) Severe winds (up to 500 miles per hour) rotating in counter-clockwise direction are the reason for their destructiveness.
      (2) They travel along the ground at speeds up to seventy miles per hour, but some have been known to stand still.
      (3) They usually affect an area in width of one-fourth to three-fourths of a mile but may cover an area one mile in diameter.
      (4) Distance covered does not usually exceed sixteen miles, but some have been recorded covering a 300-mile-long path. (Example: A tornado in Illinois and Indiana on May 26, 1917, traveled 293 miles and lasted seven hours and twenty minutes.)

2. What causes tornadoes?

    a. Theories as to formation of tornadoes

        (1) One theory holds that tornadoes are produced by circulating winds created by temperature changes in atmosphere.
        (2) A second theory stresses effects of converging circulating winds forcing in upon each other.

    b. Neither theory generally accepted

        (1) Scientists agree that neither process produces tornadoes independently.
        (2) It's probable that tornadoes are produced by combined effects of both forces, with one being stronger over the other.

3. Destructiveness of a tornado

    a. Destructiveness created through combined action of rotary winds, flying debris, and partial vacuum in center of funnel

        (1) Buildings often explode because of pressure differences on walls in the vacuum area.
        (2) A tornado can make a missile of a piece of straw.
        (3) Automobiles, storage tanks, and railroad cars can be lifted as if they are weightless.

    b. Tornado the "number one" natural disaster killer in the United States

        (1) In the past fifty years, tornadoes have killed 9,000 persons.
        (2) During same time period as above, hurricanes have killed about 5,000 people and floods about 4,000 people.

4. Frequency of occurence (Visual 7)

    a. General information regarding tornado occurrence

        (1) Records indicate that tornadoes occur in all states, but Midwest and Southeast are the most vulnerable.
        (2) Records show that tornadoes occur throughout the year at all times of the day.

            (a) Weather conditions have spawned the greatest number of tornadoes between the months of April and June.

(b) Of the total number, 82 percent occur between noon and midnight, during the warmest hours of the day.
(c) The greatest single concentration of tornadoes takes place between 4 p.m. and 6 p.m.
(d) The chance that a specific location will be struck in any one year by a tornado is small. (NOTE EXCEPTION TO THIS IN "SPECIFIC EXAMPLES OF TORNADO OCCURENCE" BELOW.)

b. Specific examples of tornado occurrence

(1) On Palm Sunday, April 11, 1965, thirty-seven tornadoes struck the Midwest killing 271 people, injuring over 5,000, and causing an estimated $300,000,000 property damage.
(2) Oklahoma City, Oklahoma, has been struck by tornadoes twenty-six times since 1892.
(3) Baldwyn, Mississippi, was struck on the same date--May 20--for three consecutive years, 1916, 1917, and 1918.
(4) Irving, Kansas, was one-third destroyed by two tornadoes striking forty-five minutes apart on May 30, 1879.
(5) Austin, Texas, suffered two tornadoes in succession on May 4, 1922.

c. Need for quick action

(1) Time for formation and time during destruction are short.
(2) Suddenness and erratic path of tornado seldom allows time for evacuation.
(3) Conditions surrounding tornado formation make it necessary that we know how to protect ourselves. Observe the following safety rules:

TORNADO SAFETY RULES

Seek shelter, preferably in a tornado cellar, underground excavation, or a steel-framed or reinforced concrete buiding of substantial construction. STAY AWAY FROM WINDOWS!!

In cities or towns:

In office buildings--stand in an interior hallway on a lower floor, preferably in the basement.

In factories--on receiving a tornado warning, post a lookout. In accordance with advance plans, workers should move quickly to the section of the plant which offers the greatest protection.

In homes--the basement usually offers the greatest safety. Seek shelter under a sturdy workbench or heavy table if possible. In a home with no basement, take cover under heavy furniture in the center part of the house. Keep some windows open, but stay away from them!

Mobile homes are particularly vulnerable to being overturned during strong winds. Trailer parks should have a community shelter. Appoint a community leader responsible for constant radio monitoring during threatening weather or during watch periods.

In Schools:

Whenever possible, go to an interior hallway on the lowest floor; AVOID AUDITORIUMS AND GYMNASIUMS or other structures with wide, free-span roofs.

If a building is not of reinforced construction, go quickly to a nearby reinforced building, or to a ravine or open ditch, and lie flat.

In Open Country:

Move away from the tornado's path at a right angle. If there is no time to escape, lie flat in the nearest depression, such as a ditch or ravine.

REMEMBER

TORNADO WATCH means tornadoes are expected to develop.

TORNADO WARNING means a tornado has actually been sighted.

KEEP LISTENING

Your radio and television stations will broadcast the latest tornado advisory information. Call the National Weather Service only to report a tornado.

5. Protection involves more than a single individual
    a. Individual and family awareness of precautions needed.
    b. School plans needed to protect a concentration of the people.
    c. Local, city, and county government tornado disaster plans needed for communities.
    d. Local, city, and federal civil defense organizations contribute to development of disaster plans.

6. Prediction and protection

   a. Exact location of severe thunderstorms and tornadoes not possible

      (1) General areas where storms could occur are predicted by the National Severe Storms Forecast Center in Kansas City, Missouri.
      (2) Atmospheric conditions are studied with the use of radar, sounding balloons, reports from airplane pilots, and satellite photographs.
      (3) The NSSFC informs the National Weather Service of the areas that may experience severe storms; the National Weather Service, in turn, informs the public by radio and television.
      (4) Types of warning issued by the National Weather Service are:

         (a) A "tornado watch," which means that a tornado might occur and people in that area should be aware of that possibility.
         (b) A "tornado warning," which is issued when a tornado has been sighted.

   b. Number of deaths declined by 42 percent since National Weather Service began severe weather forecasts and established Tornado Watch Service (1953)
   c. Adequate public warning, a prime objective

      (1) Project SKYWARN was established in January, 1969, and consists of citizen volunteers who watch for and report tornadoes to the National Weather Service.
      (2) The Weather Service plots the tornado's path, observes it on radar, and predicts its direction and rate of movement to determine where the need for warnings exists.
      (3) The effect of SKYWARN may be hindered by darkness, rainfall, man-made structures, or the terrain.
      (4) Despite its limitations, SKYWARN's effectiveness has been sufficiently demonstrated.

D. Floods

1. Introduction to floods

   a. Natural occurrence since formation of earth
   b. Flooding considered a disaster only when land occupied by man

c. Reasons for man's occupying land on waterways:

   (1) The most fertile farm land is located here.
   (2) Rivers and streams have afforded the best and most economical means of transportation and communication.

d. Man's dependence on waterways continues, despite flooding possibilities. (Approximately 10,000,000 people live in areas exposed to direct possibility of flooding; some 25,000,000 people live in areas that would be affected by floods.)

e. Unusually heavy rainfall in brief time period cause of flooding

   (1) Established rivers overflow their banks.
   (2) Flash floods occur where water pours down from highland areas into valleys.

f. Examples of flooding:

   (1) Flash flood--Hurricane Camille dumped twenty-seven inches of rainfall over mountainous areas of Virginia and West Virginia, creating considerable damage as the waters raced toward the James River.
   (2) Flooding in Rapid City, South Dakota, a resort town in the Black Hills, killed more than 200 people.

g. Increase in general loss of life and property (Visual 10)

   (1) From 1955-1969 the average annual loss of life due to floods in the United States was eighty-three.
   (2) Loss in property each year due to flooding is estimated at $1.5 to 2 billion, due partly to population increase and industrial facilities being built along river systems.
   (3) The estimated property loss due to flood damage by year 2020 will be $5,000,000,000.

h. Immediate danger from force of flood water currents

   (1) Many are drowned and injured by raging waters and debris picked up by these currents.
   (2) Entire sections of towns are washed away.
   (3) Hunger and disease are side effects of flood damage.
   (4) Death of animals, broken sewer lines, and pollution of water supply create health hazards.

2. Controlling floods

   a. Provision for dams, levees, and other flood-control devices by governmental agencies
   b. Constant watch for developing flood conditions by National Weather Service; issuance of warnings to public officials and the general public
   c. Advisory to general public of the possiblity of flooding conditions after public officials are notified

FLOOD SAFETY RULES

Before the Flood:

Keep on hand materials such as sandbags, plywood, plastic sheeting, and lumber.

Install check valves in building sewer traps to prevent flood water from backing up in sewer drains.

Arrange for auxiliary electrical supplies for hospitals and other operations which are critically affected by power failure.

Keep first aid supplies on hand.

Keep automobile fueled; if electric power is cut off, filling stations may not be able to operate pumps for several days.

Keep a stock of food which requires little cooking and no refrigeration; electric power may be interrupted.

Keep a portable radio, emergency cooking equipment, lights, and flashlights in working order.

When you receive a flood warning:

Store drinking water in clean bathtubs and in various containers. Water service may be interrupted.

If forced to leave your home and time permits, move essential items to safe ground; fill tanks to keep them from floating away; grease immovable machinery.

Move to a safe area before access is cut off by flood water.

During the Flood:

Avoid areas subject to sudden flooding.

Do not attempt to cross a flowing stream where water is above your knees.

Do not attempt to drive over a flooded road--you can be stranded, and trapped.

After the Flood:

Do not use fresh food that has come in contact with flood waters.

Test drinking water for potability; wells should be pumped out and the water tested before drinking.

Seek necessary medical care at nearest hospital. Food, clothing, shelter, and first aid are available at Red Cross shelters.

Do not visit disaster area; your presence might hamper rescue and other emergency operations.

Do not handle live electrical equipment in wet areas; electrical equipment should be checked and dried before returning to service.

Use flashlights, not lanterns or torches, to examine buildings; flammables may be inside.

Report broken utility lines to appropriate authorities.

E. Forest Fires.

1. Causes of forest fires
    a. Ten percent of forest fires caused by lightning
    b. Ninety percent started by man
    c. Chief causes of fire: intention, accident, carelessness
    d. Number of forest fires
        (1) In the last five years there have been 600,000 forest wildfires.
        (2) Three hundred and sixty thousand of these fires have occurred in the Southeast.
        (3) In the same five-year period 43,000 wildfires have occurred in Alabama.
2. Forest fires in our history
    a. Fires a nationwide problem
        (1) The worst fire in regard to acreage destroyed

occurred in Maine and New Brunswick (in 1825), destroying 3 million acres of land and killing 160 people.
(2) In Peshtigo, Wisconsin, (in 1871) over 1,500 people were killed and 1,280,000 acres of forest lands were burned.
(3) In October, 1871, in Humboldt, Wisconsin, 750 lives were lost in a forest fire.
(4) The state of Oregon, in 1933, lost as much timber by fire as had been cut in the United States during the entire previous year.
(5) In Southern California, during a one-month period in 1970 there occurred some 1,260 fires, burning 600,000 acres, killing fourteen people, destroying 900 homes.

b. Alabama's forest fire problem

(1) The state's problem is not in the size of fires (it has never suffered fires as large as the examples above), but in the number of fires that occur.
(2) Alabama had more than 20,000 fires, burning nearly 300,000 acres, in one year.
(3) The Southeast experiences the greatest threat from forest fires by number.

c. Today's largest forest fires in Alaskan interior

(1) Fires started by lightning and campfires burn in isolated areas for days or weeks before being spotted. (In 1969 four million acres of trees were destroyed by these fires.)
(2) Before federal fire programs (begun in 1939), the average annual toll was from five to eight million acres of land destroyed by fire.

d. Conditions conducive to fire

(1) The number of fires each year depends on such factors as fuel, weather, geographic region, and others. (Example: dry, hot weather; a heat source such as a campfire; needles, leaves, and twigs loose enough for oxygen to mix; a breeze to provide constant oxygen may result in a wildfire.)
(2) Proper combinations of conditions create wildfires at an almost predictable rate.

    (a) Human carelessness and maliciousness will drastically alter the rate upward.
    (b) Alabama's highest wildfire occurrence takes place in March.

e. Destruction

(1) Major fires destroy all living and nearly all organic matter on land.
(2) The greatest effect is on the environment--the loss of benefits of a green, growing forest environment on our atmosphere, soil, and water.

    (a) Air pollution is created by the smoke.
    (b) More importantly, the forest's ability to purify the air is destroyed.

(3) The soil covering that prevents erosion is destroyed.

f. Control - three-pronged attack against forest fires

(1) Educating man to the dangers of forest fires is considered an important key to fire prevention (especially through the use of Smokey the Bear).
(2) The United States Forest Service and State Forestry Commissions have set up individual units of men and machines to prevent, detect, and combat forest fires.
(3) Forest wildfires may be controlled by the following steps:

    (a) Size up the fire--consider direction, path, rate of burning, time of day, weather, fuel types, size of fire, natural barriers, access roads, water sources, escape routes, manpower.
    (b) Determine the best method of attack and how to attain the smallest loss--consider the use of tractors, fire plows, fire rakes, flaps, shovels, other equipment available for a direct or indirect method of attack.

        /1/ The direct method consists of putting water or sand on the fire, the use of fire flaps, and moving combustible materials back into the burned area. (These can safely be done with small "cool" fires.)
        /2/ The indirect method consists of moving ahead of the fire and removing the fuel from a strip of land parallel with the fire or backfiring in front of a fire. (Backfiring is setting a controlled fire in front of the wildfire and letting the wildfire burn into controlled area.)

(c) Carry out the desired method of attack.
(d) Mop up--extinguish or remove all burning materials anywhere near the edge of the burned area.

(4) Newer methods of control are being developed.

(a) Aerial suppression methods may involve either the use of light aircraft for viewing fire lanes and controlling men and equipment or the use of water bombers which dump water or chemicals on fires. (Both methods have been used in Alabama.)
(b) Aerial detection permits faster specific fire location and enables ground crews to reach fires while they are still small.
(c) Infrared cameras and scanners are used for night detection and can distinguish between campstoves and wildfires.

g. Prevention

(1) The most effective firefighting can be accomplished before the fire begins.
(2) Alabama is a leading state in new work and research being done in forest wildfire prevention.
(3) The Alabama Forestry Commission employs an expert fire prevention forester who develops programs that will reduce the number of forest fires caused by carelessness.
(4) Firefighting is hazardous due to long, exhausting hours.

(a) Many lose their lives.
(b) In the Great Idaho Fire of 1910, eighty-five people lost their lives; seventy-four of these were firefighters.

F. Earthquakes

1. Several million earthquakes occur yearly.

a. Intensity ranges from barely perceptible to causing major damage.
b. Almost no area of the world is free from earthquake danger.

(1) Land areas that border the Pacific Ocean are the most vulnerable to earthquakes.

(2) The United States is susceptible to earthquakes, but areas within the states of California and Alaska are particularly exposed to the threat (Visual 11).

(a) San Francisco was almost totally destroyed by the earthquakes and resulting fires in 1906; 700 people died in quake.
(b) In Alaska, Prince William Sound suffered an earthquake in 1964 that took 131 lives and caused $400,000,000 property damage.

c. Earthquake force severity generally measured by the Richter Scale, which measures earthquake forces on basis of zero to ten. (Note: An earthquake measuring 8.5 on the Richter Scale would be equivalent to the energy released by 12,000 atomic bombs of the size dropped upon Japan in World War II.)

2. What causes an earthquake?

a. Earth is mass in constant motion.
b. Forces within Solar System act upon earth, producing stresses and movements within earth's surface, which, in turn, produce strain and tension along many points of surface.
c. Strain on earth's surface causes slippage at weak points (called "faults").
d. Slippage and energy released by movement in surface called "earthquake."

3. What happens during an earthquake?

a. Onset of earthquake usually signaled by deep rumbling or disturbed air making rushing sound after series of violent motions in the ground.
b. Surroundings seem to disintegrate.

(1) Buildings, bridges, dams, etc. collapse or are sheared in two.
(2) Large trees are often snapped or uprooted.
(3) Chimneys, high-rise buildings, water tanks, and roads are vulnerable to vibrations; where mud, brick, or adobe is used in construction, the bricks are often returned to dust.
(4) Gas mains, water mains, fallen power lines, and fires from explosions are to be dealt with.
(5) Fires are hard to deal with because equipment and water sources are often destroyed or immobilized. (San Francisco in the 1906 earthquake was almost destroyed by the fires rather than the quake itself.)

(6) Rescue is hampered by destroyed roads and vehicles.
(7) Resulting landslides sometimes cause more loss of life than the earthquake. (In the 1970 Peru earthquake 40,000 of the 70,000 who died were swept away by a landslide.)

4. Tsunamis: Deadly offspring of earthquakes

a. Definition: Large waves of water generated in the ocean by the forces of the earthquake

(1) Tsunamis can travel over the ocean at 600 miles per hour, but they strike land at a speed of about forty miles per hour.
(2) Damages occur from the height of the water (not the speed); sometimes walls of water 100 feet high strike coastal waters, engulfing all in their path.

b. Tsunami forces cannot be controlled

(1) Once tsunamis are in motion and begin approaching land, the chance of survival lies in proper warning and action to reduce hazards prior to their strike.
(2) With adequate warning, the following can be done for protection: evacuate people, coastal areas cleared of ships, buildings shuttered, and sandbags placed in effective places.

c. Warning services

(1) The Pacific Tsunami Warning System (located in Honolulu, Hawaii) monitors disturbances and issues "tsunami warnings" to the coastline areas threatened.
(2) Seismologists (scientists who deal with the earth's surface and the stresses and pressures affecting it) are aware of areas where earthquakes are likely to strike, but generally cannot predict the time or place one will strike that will produce a tsunami.
(3) It should be assumed that earthquakes will strike without warning; knowledge and preparation are vital, therefore these safety rules should be followed:

EARTHQUAKE SAFETY RULES

During the shaking:

Do not panic. The motion is frightening; but unless it shakes something down on top of you, it is harmless. Contrary to what is shown in movies the earth does not yawn open, gulp down a neighborhood, and slam shut. Keep calm and ride it out.

If you smell gas, open windows and shut off the main valve. Then leave the building and report gas leakage to authorities. Do not re-enter the house until a utility official says it is safe.

If water pipes are damaged, shut off the supply at the main valve.

If electrical wiring is shorting out, shut off current at the main meter box.

Turn on your radio or television (if conditions permit) to get the latest emergency bulletins.

Stay off the telephone except to report an emergency.

Do not go sight-seeing.

Stay out of severely damaged buildings; aftershocks can shake them down.

G. Volcanoes

1. Volcanoes in our history

   a. No immediate threat to life and property in the United States
   b. Destruction in other areas of the world

      (1) Pompeii was destroyed by Mt. Vesuvius in 79 A.D. The city and its 16,000 people were covered by volcanic ash and dust. From its rediscovery in 1595, it is apparent that most died from suffocation and the layer of ash formed a mold around their bodies. Fear, anguish, and pain can be seen in the facial impressions left on hardened ash mold.
      (2) In 1902 Mt. Pelee erupted and destroyed St. Pierre, Martinique, killing all but two of the city's 30,000 inhabitants in a matter of minutes.
      (3) In 1963 Mt. Agung, Bali, Indonesia, killed some 1,500 people from its eruption.

(4) In 1783 in Skaptar Jokull, Iceland, there were 10,000 people killed, as well as most of the livestock; even crops in Scotland, 1,000 kilometers away, were affected.
(5) In Tamboro, Indonesia, (1815) 12,000 perished as a direct result of the earthquake; and 70,000 died because of the famine from crop destruction.
(6) La Soufriere, St. Vincent, (1902) experienced an eruption that killed 2,000 and caused the extinction of the Carib Indians.
(7) Kalut, Indonesia, (1909) lost 5,500 people.
(8) Mt. Lamington, Papua, (1951) lost 6,000 people.
(9) In Villarica, Chile, (1963-64) 30,000 people were forced to evacuate their homes.
(10) Taal, the Philippines, (1965) lost 500 lives.

2. Why do volcanoes occur?

a. Result of stresses within the earth's crust and the pressures built up because of stress
b. Shifting crust forces rocks and material to great depths in earth, increasing pressure and causing tremendously high temperatures.
c. Melting of rocks into molten masses creates pressure on surrounding earth; as pressure builds, molten rock (lava) is forced out of weak points of earth toward surface, forming mountain ulcers or eruptions (called volcanoes).

3. Dangers from volcanoes

a. Chief dangers of volcanic eruption

(1) Airborne clouds of volcanic debris and ash are created. (Cinders and ash are blown into the air, sometimes not falling for hours. These clouds wiped out Pompeii. Central Oregon has a six-inch layer of ash from an eruption at Crater Lake some 6,600 yearsago.)
(2) The flow of lava and solid particles (molten rock) covers the land in wide rivers of destruction.

b. Extent of devastation determined by size of eruption

(1) The eruption may be small enough to pose no threat to life or property.
(2) It may destroy surrounding countryside and produce clouds of debris that damage areas hundreds to thousands of miles away.

4. What is being done to save lives?
    a. Defense against volcanic eruption destructiveness
        (1) It is now possible to predict where and when a volcano will probably occur.
        (2) Through prediction, it is possible to reduce the damage that will occur during volcanic eruption.
    b. Predicting and detecting volcanic activity
        (1) Instruments similar to those used to measure earthquakes make it possible to determine whether conditions are developing that could lead to volcanic eruption.
        (2) Aerial photography using infrared devices is used to measure temperature activity in volcanic areas.
    c. Hazard reduction methods
        (1) "Risk mapping" shows areas likely to be affected by lava and debris flows in a volcanic area.
        (2) Control the use of high-risk areas.

H. Lightning

1. Weapon of the gods?
    a. Ancient man believed lightning to be a weapon of mythological gods.
    b. Other myths about lightning:
        (1) One should get in bed and remain absolutely quiet during a lightning storm.
        (2) Lightning is attracted to loud noises.
        (3) If one has a pet cat, it should be put out of the house because the cat's fur would attract lightning.
2. Lightning is dangerous
    a. Overall property damage less severe than hurricane, flood, or tornado damage; loss of life more severe than from hurricanes and tornadoes
    b. More yearly deaths from lightning than from hurricanes and tornadoes

(1) Environmental Service Data figures show that for the years 1959-1965, on the average almost 150 deaths per year were due to lightning; 250 were injured each year; over $100,000,000 property damage was suffered.
(2) Because of the intensity of the lightning bolt, it is usually fatal; but victims can sometimes be revived with proper first aid and artificial respiration.
(3) Victims who survive will have received severe electrical shock or burns or both.

3. What is lightning?

   a. Definition: Release of light and energy produced by discharging atmospheric electricity
   b. Lightning discharge may occur within a cloud, between clouds, or between the cloud and the ground; discharge between cloud and ground is greatest threat to life.
   c. Thunder is a distinct, almost explosive sound resulting from expansion of air heated by the high intensity of the lightning stroke.
   d. To measure distance between you and lightning flash--count number of seconds between lightning and thunder; divide number by five; numerator is the distance in miles.

4. To protect yourself, follow these safety rules:

LIGHTNING SAFETY RULES

These safety rules will help you save your life when lightning threatens.

Stay indoors, and do not venture outside unless absolutely necessary.

Stay away from open doors and windows, fireplaces, radiators, stoves, metal pipes, sinks, and plug-in electrical appliances.

Do not use plug-in electrical equipment such as hair dryers, electric tooth brushes, or electric razors during the storm.

Do not use the telephone during the storm--lightning may strike telephone lines outside.

Do not take laundry off the clothesline.

Do not work on fences, telephone, power lines, pipelines, or structural steel fabrication.

Do not use metal objects such as fishing rods and golf clubs. Golfers wearing cleated shoes are particularly good lightning rods.

Do not handle flammable materials in open containers.

Stop tractor work, especially when the tractor is pulling metal equipment, and dismount. Tractors and other implements in metallic contact with the ground are often struck by lightning.

Get out of the water and off small boats.

Stay in your automobile if you are traveling. Automobiles offer excellent lightning protection.

Seek shelter in buildings. If no buildings are available, your best protection is a cave, ditch, canyon, or under head-high clumps of trees in open forest glades.

When there is no shelter, avoid the highest object in the area. If only isolated trees are nearby, your best protection is to crouch in the open, keeping twice as far away from isolated trees as the trees are high.

Avoid hilltops, open spaces, wire fences, metal clotheslines, exposed sheds, and any electrically conductive elevated objects.

When you feel the electrical charge--if your hair stands on end or your skin tingles--lightning may be about to strike you. Drop to the ground immediately.

I. Winter storms

1. Blizzards are winter storms which bring extremely cold weather, strong winds, and blowing snow
    a. Winds from thirty-five to fifty or sixty miles per hour; temperatures from twenty to thirty degrees below zero
    b. Other forms of winter storms: ice storms, freezing rain
    c. Cold, polar air drawn into active low pressure disturbances
    d. High snowdrifts
    e. Results of blizzards:
        (1) Persons caught outside may find breathing difficult.
        (2) Failure of individuals to find protection may result in death.

f. Results of ice storms:

  (1) Ice on the highways causes danger.
  (2) Plants and crops are usually frozen.

2. Many deaths have resulted

  a. More than 3,000 deaths from 1936 through 1969
  b. Greatest number of deaths (354) in 1960
  c. Areas experiencing winter storms:

    (1) Lands westward from Great Lakes (North Dakota, South Dakota, Minnesota, Wisconsin, Iowa, and Nebraska) are likely to be stricken by winter storms.
    (2) Blizzards strike anywhere in the Middle West, including as far south as Texas and the Great Plains.
    (3) In the South in 1951, $50,000,000 damages occurred in Mississippi, $15,000,000 in Louisiana, and $2,000,000 in Arkansas as a result of one of the most damaging ice storms in United States history; twenty-two died as a result of the storms.
    (4) In the event of a winter storm, follow these safety rules:

GENERAL SAFETY RULES

Keep ahead of the winter storm by listening to the latest weather warnings and bulletins on radio and television.

Check battery-powered equipment before the storm arises. A portable radio or television set may be your only contact with the world outside.

Check your supply of heating fuel. Fuel carriers may not be able to move if a winter storm buries your area in snow.

Check your food and order an extra supply. Include food that requires no cooking or refrigeration in case of power failure.

Prevent fire hazards from overheated coal or oil-burning stoves, fireplaces, heaters, or furnaces.

Dress to fit the season. If you spend much time outdoors, wear loose-fitting, lightweight, warm clothing in several layers; layers can be removed to prevent perspiring and subsequent chill. Outer garments should be tightly woven, water-repellent, and hooded. Remember that entrapped, insulating air, warmed by body heat, is the best protection against cold. Layers of protective clothing are more effective and efficient than single layers of thick clothing; mittens snug at the wrists are better protection than gloves.

Make necessary trips for supplies before the storm develops. Arrange for emergency heat supply in case of power failure.

During winter storms your automobile can be your best friend--or worst enemy--depending on your preparations. Get your car winterized before the storm season begins.

Keep water out of your fuel by maintaining a full tank of gasoline.

Be equipped for the worst. Carry a winter-storm car kit, especially if cross-country travel is anticipated or if you live in the northern states. The following are suggested for a winter-storm car kit: blankets; sleeping bags; matches and candles; empty three-pound coffee can with plastic cover; facial tissue; paper towels; extra clothing; high calorie, non-perishable food; compass and road maps; knife; first aid kit; shovel; sack of sand; flashlight or signal light; windshield scraper; booster cables; two chains; fire extinguisher; catalytic heater; axe.

Plan your travel and select primary and alternate routes.

Stay indoors during storms and cold snaps unless in peak physical condition. Avoid overexertion.

Winter travel by automobile is serious business. Take your travel seriously.

If the storm exceeds or even tests your limitations, seek available refuge immediately. It is not safe to remain in the car with the heater on for keeping warm unless there is proper ventilation.

Travel in convoy with another vehicle if possible.

Drive carefully, defensively.

Do not kill yourself shoveling snow. It is extremely hard work and can bring on a heart attack--a major cause of death during and after winter storms.

J. Responding to natural disasters

1. Questions to consider (Visual 12):

   a. Who is going to help you?
   b. Where will food and water come from?
   c. Who will provide medical attention?
   d. How are you going to start over again?
   e. Where can you get help to clean up debris and begin rebuilding? (Visual 13)
   f. If you need money, where will it come from?

2. The individual

   a. Two areas of responsibility: to himself and to the community (Visual 14)

      (1) His responsibility to himself involves avoiding further injury and avoiding action that would be a threat to his health or others.
      (2) His second responsibility is one of cooperation; all existing institutions are hard pressed to meet the needs after a disaster, so cooperation is essential.

   b. Civil Defense: Individuals planning, cooperating, and working together to ensure survival and rebuilding; success depends upon individual cooperation

3. Government response

   a. Rescue relief, medical personnel, equipment, law enforcement assistance provided by adjacent cities and counties
   b. Local and state organizations, e.g., Red Cross, Salvation Army, Mennonite Disaster Service
   c. State and local government

      (1) Restoration of public utilities and emergency public transportation is a major responsibility of local and state governments.
      (2) If state and local resources are inadequate, federal assistance for such restoration can be obtained.

   d. Federal emergency relief

      (1) Low-interest loans for rebuilding are available through the Small Business Administration and the Farmers Home Administration.
      (2) The Veterans Administration can change the terms of loans for disaster victims.

(3) Government-provided temporary homes are available through government facilities, leasing existing structures, and the use of mobile homes.
(4) Housing is provided without charge until repairs can be satisfactorily made on the original dwelling.
(5) Job relief is available through "disaster unemployment assistance" in the form of temporary income and reemployment services.
(6) Legal services, mortgage and rental payments can be provided to disaster victims who are unable to make the payments.
(7) Disaster Assistance Centers ("one-stop relief centers") will be established in a disaster area. These centers will house all federal, state, and local agencies to deal with the needs of the individual victim.

ACTIVITIES

1. Invite the local Civil Preparedness coordinator or director to address the class.

2. Visit the Emergency Operations Center for your community.

3. Research local ordinances to see what is required in the area of civil preparedness.

4. Invite the National Weather Service representative to present a program on natural disasters.

5. Do a disaster history for your city.

6. Do a class survey of the hazards each class member feels is the greatest threat to the community.

7. Find out what plans have been developed to meet the threats to the community.

8. Invite the mayor, councilmen, or other local officials to discuss emergencies and what plans the city has to cope with them.

9. Find out whether your school has a natural disaster plan. If so, what are the safest areas in the school if a disaster should threaten?

10. Find out how often your school is required to conduct disaster drills.

11. Plan and conduct a local government simulation of Emergency Operations during an emergency.

12. Ask each student to develop a home disaster plan for fire and other possible emergencies.

CHAPTER TWO - SURVIVAL IN OUR NUCLEAR AGE

A. Modern nuclear warfare--our greatest potential danger

1. Possibility of nuclear destruction creates element of uncertainty
2. Destructive force of modern thermonuclear weapons much greater than earlier atomic bombs
3. Estimated that United States and Soviet Union each possess over 5,000 nuclear weapons; many other nations have or are in process of developing nuclear weapons
4. Friction between United States and Soviet Union brought world to brink of nuclear disaster (Examples: Cuban missile crisis, Korean War)
5. Conflicts in Southeast Asia and Middle East add to fear
6. As of 1972 at least five countries possess nuclear weapons
7. Survival dependent upon plans and preparation
8. The destructive power of modern weapons
    a. Survival during use of conventional (nonnuclear) bombs possible
    b. No adequate shelter from explosive power of modern nuclear weapons
        (1) The A-bombs dropped over Hiroshima and Nagasaki were measured in terms of thousands of tons of TNT (kilotons).
        (2) Today's modern nuclear weapons are measured in terms of millions of tons of TNT (megatons).
        (3) With today's weapons there would probably be total destruction within a six-mile circle of the point of explosion.

B. Original survival plan

1. Based on concepts of evacuation and dispersal
    a. Response similar to natural disaster response--evacuation
    b. Move out of population centers to countryside and outlying towns; shelter in armories, schools, and large buildings
    c. After the initial attack, people return to original area for clean-up and rebuilding
    d. Some original evacuation route signs still existtent in Alabama

2. Evacuation and dispersal no longer emphasized as best means of survival
    a. Belief now that evacuation would be unwise
    b. Belief now that survival hinges on protection more than evacuation

C. Time is an important factor

1. Possibility of no evacuation time
    a. Early evacuation and dispersal plans based upon idea of attack by thousands of planes taking hours to reach target
    b. ICBMs and satellites carrying nuclear warheads make time the most important factor
2. Missiles fired from under ground, water, and space take minutes to travel thousands of miles

D. A nuclear rain: the worst disaster of all

1. Blast destruction to land surface a major danger
2. FALLOUT more threatening than heat and blast effects

E. Fallout (radioactive dust)

1. Pulverized earth and debris sucked up into nuclear cloud as explosion occurs on or near ground
2. Debris absorbs radioactive gases; falls back to ground within twenty-four hours as radioactive dust and sand (fallout)
3. Death and injury to humans by invisible gamma rays in radioactive particles (death within four days if enough cells destroyed)

F. Its effect upon man

1. Where fallout occurs depends upon wind currents and weather conditions
2. Almost 70 percent of United States could experience fallout; no area assured of not receiving fallout
3. Fallout radiation measured in roentgens
    a. Man's five senses unable to detect nuclear radiation
    b. Some type of detection instrument required
    c. Serious illness to normal human in exposure to 400 roentgens; death if exposed to 600 roentgens over four-day period

4. Survival is dependent upon radiation fallout protection

G. We can protect ourselves

1. Little or no protection from fallout in original evacuation plans since most United States surface area affected by fallout
2. Three factors play a role in protection from fallout:

   a. Time
   b. Distance
   c. Shielding

3. First twenty-four hours of fallout most dangerous

   a. Time of greatest amount of fallout and highest intensity of radioactivity
   b. Radioactive fallout potency decline with time (decay)

4. Shielding from radiation intensity is key to human survival.
5. National Fallout Shelter Program of the 1950s establishes "fallout shelters" that provide degree and length of protection needed to survive.
6. Heavy, thick material between radioactive particles and ourselves provides shielding from harmful radioactive rays.
7. Special buildings for shelters not necessary

   a. Private home shelters can be built, but are usually too costly.
   b. Basements, inner corridors of large buildings, subways or tunnels (provided walls and roof thick and heavy enough) are adaptable for shelter spaces.
   c. Buildings using steel, concrete, or other such protection offer best protection.

H. National shelter plan

1. Providing shelter space for all people at all times is key emphasis of Defense Civil Preparedness Agency and National Fallout Shelter Program.
2. The basic aspects of the program are to locate and identify mass shelter spaces in existing buildings and to educate the average citizen as to how he can build his own home shelter.

I. Initial step: finding shelters

1. Nationwide survey to locate potential public fallout shelters begun September 1961.

   a. Conducted under the Office of Civil Defense (now the Defense Civil Preparedness Agency)
   b. Such surveys continue on new buildings and structures
   c. By March of 1972, 210,506,000 shelter spaces located

2. Generally not enough shelter spaces available for all people; many identified shelters in downtown sections of large cities not easily accessible.

J. New shelters

1. To increase number of shelter spaces, the Defense Civil Preparedness Agency administers nationwide shelter development program to aid architects and consulting engineers to include fallout shelter space in new building design (Examples: Opp High School, Opp, Alabama; Bradshaw High, Florence, Alabama)
2. Additional six million spaces expected to be located each year from new construction

K. Know where they are!

1. Informing public as to shelter locations is basic problem
2. Buildings marked with yellow triangles in black circle denote the following minimum requirements for protection met (Visual 15):

   a. Minimum fallout protection factor (PF) of forty
   b. Space for at least fifty people, each having ten square feet of room
   c. Adequate ventilation

3. Owner of the building must consent before marking as a shelter space and the owner must offer space free of charge

L. The answer lies in your community shelters

1. Heart of civil defense program is concept of local public or community shelters

   a. Effective system of protection is prime responsibility of local community and its governing bodies

   b. Entire civil defense concept stresses joint responsibility of federal, state, and local governments.
   c. Local community recognized as where action is.

2. Location within buildings of fallout protection

   a. Center rooms farther from radioactive particles, so greater amount of material between you and radiation
   b. Building basements allow even greater protection due to floors of material above you and concrete and earth around basement.

3. Other shelter areas

   a. Subway systems, such as New York's
   b. Cave shelters, such as in Huntsville; Cathedral Caverns in Grant, Alabama; and a series of caves in Anderson, Tennessee

4. Public shelter advantages

   a. Most stocked by federal government with minimum supplies, which include the following:

      (1) Food (survival crackers)
      (2) Water (one quart per person per day)
      (3) Medical supplies
      (4) Sanitation kits
      (5) Radiation detection equipment for use inside the shelter

   b. Minimum supplies based on two-week shelter stay (the amount of time needed for the intensity of radiation to decline to a safe level).
   c. Public shelters offer minimum protection factor of forty, meaning for every forty roentgens of radiation outside the shelter there would be only one roentgen inside.
   d. Defense Civil Preparedness Agency trains personnel to staff public shelters to better cope with physical and psychological problems that occur in a two-week shelter stay.
   e. Best advantage would be the human companionship.

5. Disadvantages of public shelters

   a. Bare minimum of food and water supplies
   b. Limited medical supplies; no special medicines such as those needed by diabetics or heart patients

- c. Possibility of rationing if shelter occupied by more people than stocked for
- d. Behavior problems due to stress of the unfamiliar shelter situation
- e. Problem of personal hygiene

M. Home shelters: a desirable asset

1. Construction of home shelters
    - a. Tax relief available for building shelters in home or business firms
    - b. Increases available shelter space, more quickly available, and usable as protection from some natural disasters
2. Advantages of a home shelter
    - a. Ample supply of food (as long as no refrigeration or cooking required), water, and additional items wanted
    - b. As much privacy and comfort as individual desires
    - c. No problem or worry about strangers or their behavior
3. Disadvantages of private shelters
    - a. Main question deals with "PF" (Protection Factor) of the home shelter (The tax deduction law of Alabama says it must have a PF of 100 if the tax deduction is to be used.)
    - b. Lack of specially skilled individuals (doctors) usually found at public shelters
4. Building home shelters
    - a. Basements provide considerable protection
    - b. Information regarding building and stocking home shelters available at local civil defense offices
5. Effectiveness of a shelter system
    - a. Effectiveness best realized when considered in terms of individual human beings saved--you, your family, your friends
    - b. Nationwide fallout system would be a safeguard against total destruction of human life
    - c. Shelter systems ineffective without proper warning and emergence systems

N. Civil Defense Warning System (Visual 16)

1. Beneficial use of shelter system dependent upon receiving timely warning
2. Civil Defense Warning System sends messages through federal warning systems to strategic points within each state; state and local governments responsible for warning the public
3. NAWAS (National Warning System)--central core of the warning network

    a. Almost instantaneous attack warning provided to states from three national centers: Denton, Texas; Washington, D. C.; and Colorado Springs, Colorado
    b. Main center (inside Cheyenne Mountain at Colorado Springs) in huge hollowed-out cavern of multistory buildings built on giant springs to absorb shock waves of nuclear explosion
    c. Main coordination and control of entire military defensive capability of the United States handled at Colorado Springs; attack warnings received and sent to some 1,146 warning points in the United States

4. The North American Air Defense Command,

    a. System of surveillance satellites through a joint United States--Canada defense system
    b. Radar stations throughout the United States, Canada, and Artic Circle exist to detect attack by planes and missiles
    c. Samos "eye-in-the-sky" satellite system watches entire hemispheres of the earth and can detect launching of an enemy missile the moment its engines ignite
    d. Only a ten- to fifteen-minute warning of attack possible

5. How warnings are issued

    a. Television and radio stations will broadcast warning, then go off air, with exception of certain designated stations. (This is a part of the Emergency Broadcast System.)
    b. Police and firemen communications systems and sirens used
    c. Some community siren systems existent
    d. Two basic signals:

        (1) Attention or alert--a steady blast for three to five minutes, used for peacetime emergencies; listen for emergency information over radio, television, or the siren system

(2) Attack warning--a wavering tone or short blasts for three to five minutes when an actual military attack is detected; take protective (fallout shelter) action immediately.

O. Emergence and recovery

1. As radioactive level decays, possible brief emergence from shelter
2. Necessary readjustments to life
    - a. Few, if any, accepted and accustomed ways of life possible (no television, cars, and so forth)
    - b. Apparel one has on may have to suffice for a long time
    - c. Possibility of finding pets, birds, or animals alive doubtful
    - d. Life of hardships, sorrow, and pain, but valuable nevertheless
3. Survival and recovery dependent upon organizations and individuals
    - a. Plans and procedures for nuclear emergency available in local, state, and federal governments
    - b. Public shelters will provide housing; food and water supplies checked, controlled, and rationed (if necessary) by local governments and civil defense authorities
    - c. Immediate attention given to food distribution, sanitation, public utilities, and medical facilities
    - d. Preservation of law and order will be vital governmental concern
    - e. Federal government will be vital in coordinating nation's resources, assisting local organizations in their use, and informing public through the Emergency Broadcast System
    - f. Main concept of overall Civil Defense Plan for the United States in event of nuclear war is "self-sufficiency"

ACTIVITIES

Let's Get Involved

Select from the listed activities those most appropriate for your area.

1. Have a committee or committees research and report on national, state, and local government organization and responsibility for civil defense action.

2. Study and discuss the local defense plan in class and then invite someone from the local civil defense office to interpret the plan and answer questions about it.

3. Research and report on the types of disasters, including nuclear, to which there should be a civil defense response.

4. Evaluate the school's emergency plan and make recommendations to the principal concerning any needed revisions.

5. Prepare a demonstration of the "alert" and "warning" signals and discuss the proper response to each.

6. Select a space in the school for a fallout shelter. List all the factors involved in making the choice. If a fallout shelter exists, study the school's shelter space and the supplies in it and recommend any needed improvements.

7. Locate public fallout shelters on a map of your city, town, or county.

8. Have students plan a shelter for a typical local home, or have each student draw up plans for a fallout shelter in his own home. Make models.

9. Develop with the class a list of home shelter supplies. Have students draw up two lists: (1) essential home shelter supplies and (2) desirable home shelter supplies. Discuss why certain things are placed on one list or the other.

10. Discuss the relative merits of home and public fallout shelters and try to reach some conclusions about which would be better in your area and for your family and why. This could be a debate.

11. If possible, visit a home fallout shelter or have a model constructed to display in your school.

12. Study ideas for improvised fallout shelters, and decide on some to put together for school and home use. Make models.

13. Analyze the factors of home fallout shelters that have value for other disasters.

14. Have any or all of the above activities carried out by group or individual assignments.

15. Visit a community shelter with the Shelter Manager and have him explain organization and purposes.

16. Have each student make his own list of the problems he thinks would arise in a community shelter situation--a large number of people confined for a long period of time in a small space.

17. Compare lists and classify problems. Assign groups of students to develop possible solutions to different types of problems, i.e., training, keeping order, rationing, sanitation, recreation, medical care.

18. Have each group report to the class its suggested solutions to its problem area. Discuss with the class.

19. Develop a class list of generalized rules governing conduct in a shelter.

20. Plan and conduct a shelter exercise.

CHAPTER THREE - CIVIL DEFENSE IN OTHER NATIONS

A. NOTE: This chapter presents an imaginary journey of a ninth-grade student and his civics teacher as they visit foreign countries and interview students about radiation protection and civil defense in their countries

B. Civil Defense in Cuba

  1. Protection centered in underground shelters

    a. Existing caves that have been converted or tunnels that have been built
    b. More than 3000 natural or man-made shelters

  2. Underground hospitals in some provinces

C. Civil Defense in France

  1. Blast shelters and testing programs begun in 1950
  2. Continual expansion and improvement of the civil defense program

D. Civil Defense in Switzerland

  1. Provides shelter program though country objects to war
  2. Two types of shelters

    a. Deep caves stocked with supplies for the civilian population
    b. Fabricated military shelters, constructed like modular pipes, with seal-proof doors, food, and furniture

E. Civil Defense in Egypt

  1. Stocks shelters with the most advanced supplies and elaborate equipment
  2. Mobile medical teams provided with modern treatment techniques

F. Civil Defense in Israel

  1. The civil defense organization called HAGA

    a. Men and women required to serve in HAGA
    b. Civil defense chief holds rank of Colonel
    c. Primarily concerned with survival during and after conventional warfare

2. HAGA activities

    a. Learning first aid
    b. Learning to inspect factories, schools, and homes for damages
    c. Responding to emergency signals within minutes

G. Civil Defense in the Union of Soviet Socialist Republic

1. Soviet shelter program--the first aspect of the Soviet program

    a. Large city shelters concentrated in designated areas, equipped for prolonged occupancy (shelters include larger buildings, basements, and some subways)
    b. Small town and farm shelters constructed in basements, vegetable cellars, caves, mines, and covered trenches, some with filter ventilation systems and bottled oxygen
    c. Rural-area shelters only built when actual threat of war occurs; shelters built in twenty to thirty man-hours

2. Evacuation and dispersal of urban population to rural areas main aspect of Soviet program

    a. Attack on unprotected large city may result in deaths of 90 percent of the population; evacuation believed to lower death percentage to 5 to 8 percent.
    b. Industrial workers scheduled to remain at jobs and live in special shelters
    c. Nonessential workers, school and preschool children, and the retired population evacuated to rural areas to assist in building hasty shelters
    d. Detailed evacuation plans include:

        (1) Time schedules for departure at collecting points
        (2) The availability of a doctor or nurse with each group
        (3) Instructions as to what each family should bring, according to the climate and season
        (4) Special evacuation passes for each person

    e. Experience in evacuation and dispersal results of successful World War II transfer of ten million people and 1,300 industries to rural areas

f. Improvements in railroad transport, motor and maritime transportation, subway systems, and a new civil defense transport system increase likelihood of successful evacuation

g. Villagers trained to protect livestock from radioactive fallout and to protect food and fodder storage from contamination

h. Provision for evacuation of essential industrial machinery and workers to farms

i. Farmers and their families to train evacuated city dwellers to assist in food production

3. Educating the public concerning survival preparedness--the third aspect of Soviet civil defense

   a. Educating the youth

      (1) The Law of Universal Military Obligation has introduced basic military training in high schools and trade schools (as well as in factories, institutions and collective farms) and includes knowledge and protection of the properties of weapons of mass destruction.
      (2) Compulsory civil defense education is taught in the fifth, sixth, and seventh grades.
      (3) Some schools teach use of small arms, motorcycles, and parachutes.
      (4) Inducements for learning about civil defense include visits to national monuments and sessions with people who participated in the defense of Moscow in World War II. (These men have been told to link bravery with the action behind the lines, as well as the battlefield.)
      (5) Summer camps offer pennants, citations, occasional television coverage and such for excellence in civil defense drills and exercises.

   b. At industrial plants

      (1) Contests are held among civil defense squadrons.
      (2) Distinguished performances in civil defense are given newspaper publicity.
      (3) Industrial workers, shop heads, and so forth may be named in the magazine Military Knowledge for outstanding work in civil defense.
      (4) Those who are found lacking in civil defense duties are also named in Military Knowledge.

4. Civil defense training compulsory and universal

   a. All groups are exposed to it.

   b. Exposure of civil defense is given in movies, television, radio, magazines, newspapers, and factory publications.
   c. Courses are tailored to the needs and ability of trainees.

H. Civil Defense in China

   1. Civil Defense education at school

      a. Elementary students are taught to identify aircraft and shoot them with guns.
      b. Ninth graders study civil defense training films.

   2. Shelters

      a. Each citizen of China is assigned to make twenty bricks for construction of fallout shelters.
      b. Huge tunnels have been built and stockpiled with food.

   3. Industries, factories, and small plants scattered throughout the country; almost impossible to destroy any particular industry by bombing a city or a group of cities

I. Civil Defense in Norway

   1. Training taught in schools
   2. Lectures, practical methods of survival, and field trips to civil defense centers part of training

J. Civil Defense in Canada

   1. Canadian program called Emergency Measures Organization
   2. Experimenting with reinforced fiberglass shelters

ACTIVITIES

1. Write to the United Nations for information about disaster relief programs.

2. Write to the embassies of some countries for information about their Civil Preparedness programs. Discuss this information.

3. Compare the required programs for Civil Preparedness in the various countries.

4. Research recent newspaper files for major disasters that have occurred in other countries. Find out if the United States responded with humanitarian relief.

5. Prepare a list of the major disasters that have occurred throughout the world.

CHAPTER FOUR - CIVIL DEFENSE IN TIME OF EMERGENCY

A. What is Civil Defense?

1. Definition: Planning and preparing for emergencies; government response during an emergency; recovery operations following an emergency
    a. Primary objective--saving human lives
    b. Utilization of existing organizations and groups of people for the purpose of responding to human needs in time of emergency
    c. Grounded in the concept that saving lives and recovery after disaster must be a joint responsibility and cooperative partnership among federal, state, and local governments, voluntary organizations, and individuals

2. Effective disaster preparedness
    a. Local community preparation for response to disasters before they occur in order to minimize the disaster's impact
    b. Local community preparation to respond with all available resources

B. The Federal Role

1. Council of National Defense created in 1916 but dissolved two years later
2. National Defense Advisory Commission created during Roosevelt administration (1940)
3. Office of Civilian Defense established (1941)
4. Federal Civil Defense Act of 1950 authorized and established current National Civil Defense Program (Truman administration)
5. Responsibility of the federal government
    a. To provide guidance and direction, financial, and other assistance to the states and their local communities (works with all fifty states and some 10,000 local communities)
    b. To make money and equipment available to state, county, and city governments for improvement of emergency response capability (Example: "On-Site Assistance Programs" where local areas are surveyed by federal, state, and local civil defense personnel, recommendations are made to local governments and assistance is given, if desired, to improve capabilities.)

- c. Trains federal, state, and local personnel for the Defense Civil Preparedness Agency at a Staff College in Battle Creek, Michigan, in areas such as shelter management, radiological monitoring, and industrial civil defense management.

    - (1) Extension services of some universities offer civil defense courses. (The University of Alabama offers these courses.)
    - (2) The State of Alabama has made available basic civil defense courses to all colleges within the state if they wish to offer them.

C. Where the Action Is

1. National publicity given to the federal government's role in developing and maintaining the Civil Defense Program.
2. State and local-level actions seldom seen, but they must be ready for the "government in emergency" response.

D. The State's Role

1. Federal Civil Defense Act of 1950 authorized establishment of civil defense departments in each state.

    - a. Set up under existing government structure.
    - b. Governor of each state, according to state legislation, responsible for civil defense operations (In Alabama this was set up under Act No. 47, Regular Session, 1955.)

2. State civil defense offers guidance, training, and coordination to political subdivisions within state.
3. State legislation covers possible services needed during disaster.

    - a. Civil Defense Act and Alabama laws direct all regular functions of government
    - b. Everyday services of existing organizations directed to respond to disasters, using regular employees of these organizations

4. Additional laws to cover emergency conditions

    - a. Alabama legislators directed to select three qualified men to act as their successors if unable to carry out their duties in a nuclear disaster (Act No. 875)

   b. Fallout shelters required by state legislation in all new public buildings (including schools) where public funds used in construction (Act Nos. 756 and 757) unless this causes economic hardships on the owner.

5. Hurricane Camille: An example of the state working in a disaster

   a. State highway Department and the State Department of Public Safety concentrated personnel and equipment in areas likely to suffer heavy damage.
   b. Department of Pensions and Security alerted personnel to be ready with welfare assistance and services.
   c. Department of Health prepared for emergency handled by the Department of Conservation.
   d. Public Service Commission handled transportation of personnel and equipment.
   e. Alabama National Guard alerted for possible support service to civil defense.
   f. Department of Public Safety, assisted by the National Guard, evacuated people in low-lying areas.
   g. Supplemental help alerted in case local governments and civil defense systems unable to meet all of the needs.
   h. State legislation legalizes authority and power of local civil defense.

E. The Local Role

1. Local structure similar to state and federal governments.
2. Local directors and coordinators serve mayors, commissioners, local agencies in organizing, planning for disasters, creating interest, and community involvement in coping with emergencies.
3. Local assistance from police, fire departments, ambulance services, doctors, hospitals, churches, radio and television stations, and volunteer organizations.
4. Emergency Operations Center (EOC)--the "command post".

   a. A centralized point for emergency communications and coordination.
   b. Chief executive, department heads, regular governmental services function on an emergency basis at EOC.
   c. Development of new disaster situations reported to EOC; necessary response made by the required agency.

F. Example of a Simulated Disaster Exercise:

Mock Disaster Exercise

June 30, 1972

On June 30, 1972, Huntsville and Madison County conducted a mock disaster exercise. This type exercise is prepared and conducted annually to test emergency plans, equipment, and to train personnel to react quickly and efficiently to disaster-type situations. These training exercises are considered invaluable in preparing for overall community preparedness.

This year the exercise was based upon a simulated major aircraft crash at the Huntsville-Madison County Jetplex. The overall purpose of the exercise was to:

1. Test the internal Emergency Operations Plan of the Jetplex.
2. Test the internal Emergency Operations Plan of each of the five hospitals in the Huntsville-Madison County area to include the Redstone Arsenal Hospital.
3. Test the Consolidated Disaster Hospital Plan which coordinates the actions of the five hospitals, ambulance services, and the local government through the facilities of the Huntsville-Madison County Civil Defense Emergency Operations Center.
4. Test the local government Emergency Operations Plan which provides support and coordination of actions under these type emergency conditions.
5. Train personnel.
6. Check adequacy and operational capability of all equipment, especially the ability to quickly establish and maintain adequate radio communications.

The entire effort was the result of detailed planning and overall community participation. The following is a partial list of participants:

1. The Mayor and Chairman of the Madison County Commission and selected department heads of the City and County that would actually be called to partially man the EOC under what is termed a "Condition II" emergency under our local government Emergency Operations Plan.
2. Department heads and officials and volunteer units that actually manned the EOC included:

Madison County Commission Chairman
Mayor
Rescue Squad
Huntsville Police Chief
Madison County Sheriff

Huntsville Fire Chief
Representative of State Troopers
Deputy Director of Public Works
Representatives of Madison County
RACES operators
CD Director and operating staff

3. Other participation included:

Explorer Scouts and church groups as simulated casualties
Huntsville Utilities
South Central Bell Telephone Company
Madison Police Department
Madison County Board of Education Garage personnel and buses
Huntsville Fire Department
Huntsville Police Department
Madison County Rescue Squad
Huntsville-Madison County CD Mobile Communications Center
RACES mobile units
Agnew Ambulance Service
Individual hospitals (actually included call-up of doctors, nurses, and technicians as required under their internal emergency plans)
American Red Cross

The scenario for the exercise was substantially as follows:

1. At an unannounced time, Jetplex personnel notified the Civil Defense Office of a major aircraft crash that involved numerous casualties.
2. The Civil Defense Office immediately notified Huntsville Hospital, the base hospital, to activate the Consolidated Hospital Disaster Plan.
3. The Civil Defense Office had police immediately deliver radios on Civil Defense frequency to all hospitals, the triage areas, and Jetplex. They set up traffic control and security.
4. The Civil Defense Office confirmed crash and reported to Huntsville Hospital estimated number of casualties.
5. The Civil Defense Office notified local government "Condition II" emergency existed and EOC was to be partially manned.
6. The Huntsville-Madison County Civil Defense EOC verified communications with all hospitals, triage area and others checking in.
7. The Civil Defense Director briefed partially manned EOC staff as indicated above of situation and status.
8. The Civil Defense Mobile Communications Center verified local communications control.

9. Responding to requests sent to local government, the Red Cross, and hospitals concluded the exercise.

All local radio stations, TV stations, and newspapers participated by announcing the exercise was to be conducted. The releases presented the scope of the exercise. TV coverage on the day of the actual exercise was in color on all three TV stations. Different phases of the operation were shown. Newspaper coverage including pictures was also given.

ACTIVITIES

Let's Get Involved

1. Have students gather information of past disasters relative to the cleanup and rebuilding of communities after earthquakes, tornadoes, hurricanes, blizzards, large-scale fires, civil disorders, floods, and other natural and man-made disasters.

2. Have one or two students report on the postwar problems faced by the surviving residents of Hiroshima and Nagasaki.

3. Discuss together the concept of government in emergency and the functions of government and other groups in a post-disaster situation. Then present the idea "Suppose the disaster was so great and so widespread that the structure of government didn't survive. Suppose there was no government. What would the survivors do?"

4. Have the class pretend that they are post-disaster survivors in their community and discuss what they would have to do as individual citizens and as members of a government or community organization, industry, etc., to help get the community going again.

5. Have each student make a list of what he considers the priority items of reconstruction following a community disaster. Compare. Discuss.

6. Discuss human interdependence and the need for cooperation during and after disaster situations.

7. List the government and quasi-government agencies, industries, civic organizations, and voluntary groups that are involved in post-disaster planning and action, and some of the functions performed by each.

8. Survey the school, neighborhood, or local jurisdiction as to citizens' knowledge of civil preparedness. Use a pupil-prepared questionnaire.

9. Find out what civil preparedness training and education are available to the individual.

10. Find out what aid is available to the individual and families in the event of a major disaster.

11. Find out what plans have been made by your hospital to deal with emergencies or disasters.

12. Develop a list of key references pertaining to disasters and present to school librarian for possible addition to the library.

CHAPTER FIVE - POLLUTION PROBLEMS

A. Introduction

1. Examples showing man's concern with his environment

   a. Refusal of one noted ecologist and author to take out life insurance because of belief that man is doomed to annihilation from pollution and/or nuclear war
   b. Comic strip characters identify polluters as "he is us."

2. The two sides of the pollution process:

   a. Man and his activities
   b. Natural pollution

B. Natural pollution: Examples

1. Indonesian volcano (1956) spewing millions of tons of matter into the air; elimination of matter in air from that eruption took eight to ten years
2. Menhaden (a type of fish) dying by the millions each summer in Chesapeake Bay; cause not known, called a NATURAL PROCESS
3. Thunder and the sounds of high winds--examples of sound pollution
4. Pine pollen released into the air and smoke of a forest fire--types of air pollution
5. Once-deep Mobile Bay now an average depth of only nine feet due to sedimentation

C. Definition of pollution: Deposition of material in the environment posing direct threat to man or man's life support system (life support system also known as ecosystem)

1. Various feelings as to what constitutes pollution; pollution to one individual or nation may not be considered such by another.

   a. Sedimentation in Mobile Bay viewed as pollution by oyster gatherers, but to farmer the depositing of soil along shore brings high-yield crops
   b. Pine pollen harmful to the hay fever sufferer but aids the tree farmer and forester economically

2. Measurement of disposed waste products needed to determine threats to life support systems.

D. Growing problem of pollution

1. Addition of man-made pollutants to natural pollutants creates burden too great for nature to control.

    a. Ecology: Forms of life on earth and how they survive; system: way of life
    b. All life (including man) contributes to welfare of other life and becomes part of ecosystem.
    c. Multiplier effect when man-made pollutants added to natural pollutants

2. Population growth creating environmental imbalance

    a. Population of one billion in 1830; doubled to two billion by 1930; doubled to four billion by 1972
    b. World population growth rate of 190,000 per day in 1972; annual growth rate now 72,000,000 people (equivalent to the population of twenty-four Alabamas)
    c. Causes and effects of overpopulation:

        (1) Improvements in medicine and surgical practices have added years to life spans.
        (2) The daily growth rate is far in excess of the 10,000 people per day dying of malnutrition and starvation.
        (3) The United States with its food surplus can support about twice the population, which should be reached about the year 2070.

3. Pollution awareness heightened by growth of urban industrialized areas

    a. Concentration of people in small areas created awareness of vast resources needed for their support
    b. Rivers and Harbors Act (1899)--one of the first anti-pollution laws--prohibited the discharge of a solid pollutant into a river or stream
    c. National awareness of pollution problems not forthcoming until the late 1950s

        (1) In heavily populated areas air pollution resulted in smog, disappearance of commercial fishing sites, and appearance of "No Swimming" signs in resort towns.
        (2) Rural areas were also affected, as in the case of Gadsden's sewage and industrial waste being dumped into the Coosa River and becoming a major problems for towns downstream, or the smoggy, odorous conditions of industrial Tuscaloosa settling in areas nearby.

(3) Millions of pounds of solid waste now collected are being burned (creating air pollution) or being allowed to decay in dumps (contaminating subsurface drinking water).

E. Courses of action

1. Population control

   a. Demand for more goods and services increases pollution
   b. Population control program in India

2. Alternative of no action for population control and pollution

   a. Reduced production of goods to avoid pollution
   b. Food rationing
   c. Continued growth of already congested traffic and living areas
   d. Increased noise pollution

3. Review of national commitments needed to determine if pollution problems a priority

CHAPTER SIX - AIR POLLUTION

A. Introduction

1. Natural air pollution

   a. Air made of nitrogen, oxygen, carbon dioxide, other gases, water vapor, dust, and other particles; no such thing as "completely clean air"
   b. Natural pollution (dust storms, tornadoes, volcanoes, hurricanes, forest fires) since first appearance of man
   c. Natural air pollution no threat; natural processes of wind and rain cleaned air sufficiently

2. Effect of expanding population and increasing industry is man-made air pollution (Visual 17)

3. Measuring air pollution

   Standards set by Environmental Protection Agency, Washington, D. C.

   a. The maximum allowable level of particles in the atmosphere should not exceed seventy-five micrograms per cubic meter of air.
   b. Any count above seventy-five micrograms per cubic meter of air may constitute a threat to man's health, damage crops, corrode metals, and curtail outdoor activities.

4. Man's immediate necessity--air; possible to live five weeks without food, seven days without water, only five minutes without air

B. Status of air pollution

1. Statewide air pollution

   a. Pollutants concentrated in urban, industrialized areas of Gadsden, Mobile, and Birmingham
   b. Seven hundred fifty thousand tons of pollutants emitted annually in metropolitan Birmingham

2. Worldwide air pollution

   a. Former Secretary General of the United Nations, U. Thant, pointed out in a 1970 speech:

      (1) Crisis proportions of air pollution in some areas
      (2) Universal scope of air pollution
      (3) Air pollution as a threat to man's survival

b. Tokyo, Japan, (sometimes called world's most polluted city) so polluted that government installed coin-operated machines on street corners that dispense oxygen

3. Drifting odors and smoke of large cities pollute small towns and rural areas.

C. Two general types of pollution: particulate matter and gases (Visual 18)

1. Particulate matter

a. Definition: Solid or liquid matter such as dust, fumes, smoke, mists or sprays in the atmosphere.

(1) Particles are measured in micrograms; according to the EPA, no city should have a particulate count exceeding 260 for any one day.
(2) Newspapers in large cities usually publish the particulate count.
(3) During a recent twelve-month period Birmingham exceeded the particulate level on sixty-two days, Mobile on three days, and Huntsville on one day.

b. Particulate matter and temperature inversion

(1) A rapid building of pollutants occurs when a mass of warm air covers a mass of cool air; the cooler air is trapped by the warmer air and cannot rise (called air inversion); pollutants are also trapped and cannot be carried away by the winds.
(2) Emergency procedures may be enforced when air inversions occur and the particulate count reaches 375 in a twenty-four-hour period.
(3) Examples of air inversions:

(a) Birmingham, Alabama, had twenty-three industries closed until the inversion ended in November, 1971, under the Federal Clean Air Act of 1970 when the particulate count reached 675.
(b) Meuse Valley, Belgium, (in 1930) suffered an air inversion that killed sixty and produced ill effects for 6,000 people.
(c) London had an air inversion in 1952 that lasted for five days. (Four thousand more people died than the average death rate.)
(d) Donora, Pennsylvania, (1948) experienced an inversion which killed twenty and 6,000 became ill.

c. Particulate matter and rainfall

  (1) Large additions of man-made particles have increased rainfall in highly polluted areas.
  (2) Research regarding particulate matter and rainfall:

    (a) LaPorte, Indiana, (30 miles downwind of Chicago) shows increased rainfall when the steel industry of Chicago is in full production.
    (b) Tulsa, Oklahoma, research into rainfall has shown an increase when industry is in full production.
    (c) Research indicates a drop in rainfall on weekends in industrial areas.

d. Particulate matter and haze or smog

  (1) Excessive particulate matter reduces the sunlight reaching polluted cities.

    (a) Gadsden, Huntsville, and Tuscaloosa are subjected to hazy condition created by pollution.
    (b) Leningrad has 70 percent less sunlight in the winter due to smoke of coal fires.
    (c) London has 20 percent more daylight in areas of city where air pollution is lowest.

  (2) Rural areas have 15 to 20 percent more sunlight due to less pollution.

e. Particulate matter and dust

  (1) Falling particulates become a problem of dust accumulation on cars, houses, and vegetation.
  (2) In areas of cement, fertilizer, or steel mills people are constantly washing cars to remove dust.
  (3) Midfield, Alabama, residents have found that a solution of vinegar and water removes industrial dust.

2. Gaseous Pollutants

  a. Sulfur oxides, formed as a result of burning fuels, trash, or in manufacturing processes, combining with oxygen and moisture in the atmosphere become the corrosive agent, sulfuric acid.

b. Examples of effects of gaseous pollutants:

(1) Marble, limestone, and mortar flake erode into a powdery substance when exposed to sulfur oxide.
(2) Cotton, wool, and silk weaken and deteriorate when continually exposed to sulfuric acid, ozone, and other air pollutants.
(3) Nylon material, such as in stockings, deteriorates to some extent within minutes when subjected to gaseous pollutants.
(4) Paper becomes brittle and loses its strength when it absorbs sulfur dioxide.
(5) Sulfur dioxide damages and destroys some crops such as corn, lettuce, and tobacco, retarding growth in some cases and creating smaller yields.

c. Carbon monoxide

(1) Carbon monoxide reduces the oxygen content of the blood. Nature of carbon monoxide:

(a) It is an emission from gasoline engines.
(b) Certain atmospheric conditions and areas of heavy traffic bring the carbon monoxide count to dangerously high levels.

(2) The effects of high carbon monoxide counts include the following:

(a) Persons with heart and circulatory disorders are the first affected.
(b) Severe headaches
(c) Eye irritation
(d) Blurred vision
(e) Dizziness
(f) Slowed physical responses

d. Oxides of nitrogen

(1) Deadly nitrogen oxide gases form when fuels burn and nitrogen combines with oxygen. (A Cleveland, Ohio, hospital x-ray file room caught fire. The burning x-rays created nitrogen dioxide gas that killed several people.)
(2) Effects of nitrogen oxides:

(a) They cause injury to vegetation, clothing, and metals as sulfur oxides do.

        - (b) Aluminum corrodes five times as fast as it would if the air did not contain these nitrogen oxides; iron corrodes six times faster and steel thirty times faster with the presence of nitrogen oxides.
        - (c) Lung and respiratory diseases are effects of nitrogen oxides.

e. Hydrocarbons

- (1) Hydrocarbons are formed by the burning of fuels.
- (2) Effects of hydrocarbons:
    - (a) An investigation of pine trees withering and dying over 100 miles from Los Angeles revealed cause to be the smog overflowing from Los Angeles.
    - (b) Man's respiratory tract is damaged.

f. Photochemical oxidants (ozone)

- (1) This pollutant is produced from the combination of nitrogen oxides and hydrocarbons.
- (2) Effects of ozone:
    - (a) Ozone irritates eye, nose, and throat areas.
    - (b) It damages plants, especially the leaves.
    - (c) It damages cloth and rubber goods and creates cleaning and laundry bills about three times greater than in areas of low ozone concentration.
    - (d) Rugs, carpets, draperies, and upholstery need cleaning and replacement more often.
    - (e) Automobile tires crack along the sides and windshield wipers wear out.

3. Other pollutants

a. Ponderosa pines in Spokane, Washington, killed from flourides of aluminum ore plant

b. Effects on cattle after eating flouride-covered plants.

- (1) Teeth become spotted and streaked.
- (2) The cattle lose weight.
- (3) They give less milk.
- (4) Growth of young cattle is retarded.
- (5) Many become crippled and have to be slaughtered.

4. Air pollution and health

a. Physical damage to numerous areas of the body; may not be detected until after severe damage

b. Connected with a number of diseases but not proved to be the sole cause of any disease

c. Methods of studying relationship of air pollution and certain diseases:

(1) Epidemiological survey: This is a study of the effects of a disease on a community; how it's contracted and spread; the relationship of age, race, sex, climate, and other factors; and the long-range results on the community.
(2) Clinical study: This is a study of a disease in a living person. These studies are used to verify epidemiological surveys.

d. Diseases caused in part or aggravated by air pollution

(1) Pulmonary emphysema deaths have increased twenty-fold in the United States since the 1960s. (Jefferson County, Alabama, has experienced a 200 percent increase in deaths from pulmonary emphysema.) (Visual 19)
(2) Chances of developing pneumonia are accelerated by air pollution.
(3) Air pollution creates a strain on the lungs and heart by demanding the heart to pump harder to circulate blood faster, so that oxygen flow may be increased; for those who may already have heart disease, asthma, or chronic bronchitis, the strain is even greater.
(4) Lung cancer has been connected to the pollutants of benzopyrene and hydrocarbons; and in areas of high air pollution, lung cancer deaths have increased.

D. Solutions to air pollution

1. The role of government

a. Federal level

(1) The Federal Clean Air Acts of 1967 and 1970 set air quality standards.
(2) The Environmental Protection Agency was created in the 1970 Clean Air Act to control pollution by having each city strive for a particulate count of sixty micrograms per cubic meter of air, and achieving this through relocation of industrial plants, tests and inspections of auto emission systems, enacting commuter taxes, rationing gasoline, or staggering working hours of commuters to the city.
(3) EPA has the right to veto and substitute its own plan if a state fails to enforce and reach air quality standards.

(4) The 1970 Clean Air Act requires auto manufacturers to install low-pollution exhaust systems by 1975 which will reduce the emission of hydrocarbons and carbon monoxide by 90 percent of the 1970 emission level.
(5) Radioactive detection equipment has been installed in New York City and Chicago by the Defense Civil Preparedness Agency to measure the types of air pollutants.

b. State level

(1) In April of 1964, Governor Wallace issued a letter to the Alabama Department of Public Health, giving them the responsibility of controlling air pollution in Alabama.
(2) The Air Pollution Control Act of 1971 enabled the state to carry out federal guidelines of the Clean Air Act of 1970.
(3) The Alabama Air Pollution Control Commission:

(a) Consists of seven members, chaired by the State Health Officer. Other members are appointed by the governor. By law one member must be a licensed physician trained and experienced in respiratory disease, one must be a registered engineer with experience and training in air pollution control, and other four members may be any citizen of the state as long as he is not an officer or a stockholder owning 7½ percent or more voting stock in a corporation with a permit from the Commission to emit pollutants.
(b) The Commission imposes a fine of up to $10,000 per day on a corporation or individual violating an operating permit.
(c) The Commission operates on a permit system, issuing them to industries which might pollute the air.

2. The role of industry

a. Average annual expenditure of $300 million since 1969 for air pollution control devices
b. Efforts of Pittsburgh to reduce air pollution:

(1) Once known as "The Smoky City," it now should be known as the "The Smokeless City."
(2) Smoke and dustfall have been reduced by 84 percent since World War II.

(3) Cooperation among homeowners (not to burn soft coal; to install smoke preventive fuel burners), industry (reduction and elimination of smoke emissions), and shipping (shift from steam to diesel power) was essential.
(4) Over $380 million was spent on this change; homeowners paid about one-fourth, industry the remainder.
(5) There is an annual estimated personal savings of $41 million in laundry and cleaning bills.

3. The role of the individual

a. Prerogative of private citizens to bring suits against any company or person violating emission control standards of the EPA
b. Prerogative of individuals to sue EPA administrator if he fails in his duties set by Clean Air Act of 1970
c. Equal time allowed by Federal Communication Commission for citizens (or groups) and industry to debate advertising claims on a nonpollution product

ACTIVITIES

Air Pollution

1. To demonstrate the presence of particulate matter in the air, spread a thin coat of petroleum jelly on pieces of white poster board. Place them in areas around the school.

2. Have students compile a list of how we each contribute to air pollution. Realizing that not all could be eliminated, discuss ways to reduce air pollution.

3. Interview local industries to find out if air pollution control measures have been installed. What economic factors were involved?

4. Invite a member of the state air pollution control agency to discuss state and local problems and solutions.

5. What local ordinances are enforced in the air pollution area?

6. Determine what citizens' groups are organized at the state and local levels.

7. Write to the Alabama Department of Public Health and obtain information about respiratory problems statewide and for your area.

8. Invite a physician to speak to the class about respiratory problems and pollution.

9. Research and discuss the environmental effects of the destruction of the ozone layer of the atmosphere.

10. Keep a daily record of the pollution count for your area for several weeks. What factors produced the variation, if any?

CHAPTER SEVEN - NOISE POLLUTION

A. Introduction

1. Noise pollution - a constantly growing problem

   a. Man subjected to noise day and night
   b. Sustained listening to loud sounds possibly damaging to man's nervous system
   c. Rock music or similar loud sounds possible cause of hearing loss

2. Sound created when matter set in motion

   a. Vibrations of motion intercepted by receiving device, such as the ear
   b. Difficult to classify when sound becomes noise
   c. Noise usually considered loud and unwanted sounds

3. Measuring sound (Visual 20)

   a. Intensity or loudness measured by decibel unit
   b. Normal range of human hearing is 0 to 130 decibels
   c. Above 85 decibels sound called noise; below 45 decibels sound seldom called noise
   d. Sixty decibel measurement of normal conversation; 85 decibel measurement (or more) of diesel trucks
   e. Some permanent hearing after prolonged exposure to noise levels over 90 decibels

B. Sources of noise pollution (Visual 21)

1. Population growth and urbanization

   a. Increased noise pollution with increased population
   b. Growing urban areas noisy
   c. Seventy-five percent of population living in world's largest cities surrounded by sound levels in excess of 90 decibels during day and night

2. Transportation

   a. Three-fourths of the everyday noise in United States from motor-driven vehicles

      (1) In 1972 there were approximately 100 million autos registered in the United States (one car for every two people).
      (2) Normal traffic noise in large cities registers around 90 decibels; small town traffic noise registers around 75 decibels.

b. Noise equated with power

   (1) Modern cars are built so that they are quieter inside; but loud motors, exhausts, etc. make people think they are more powerful.
   (2) Automobile and motorcycle manufacturers may be slow to muffle engines for fear of losing trade.

c. Loud noises from trains

   (1) Steel wheels on subway trains are magnified on reflective walls of subway tunnels.
   (2) Experiments are now being conducted with rubber wheels to reduce noise levels.

d. Airplanes

   (1) With the expansion of cities, towns, and airports, aircraft frequently take off and land on runways surrounded by homes.
   (2) An estimated 13 million people live close enough to airports to suffer from the noise of air traffic.

      (a) Chicago's internatinal airport has craft taking off or landing every 60 seconds.
      (b) The Atlanta airport has a similar average.

e. Mental fatigue result of frequent exposure to sonic booms

3. Residential noise

   a. Homes, apartments, and buildings built closer together
   b. More traffic, congested play areas, and overcrowded schools in residential areas
   c. Increased noise due to flimsy construction and poor soundproofing
   d. Majority of noise inside home due to numerous appliances

4. Industrial noise

   a. Factory noise increased with mass production
   b. No laws to control noise levels in industry

C. Effects of noise pollution

1. Physical effects

    a. Undetectable damage to individuals (stress, tension, nervous strain) from noises, interfering with relaxation and sleep
    b. Permanent damage to the 23,000 celia (hearing sensors) in the inner ear from continued exposure to loud noises

        (1) Rock bands frequently approach 120-150 db. level, which cause pain to some.
        (2) Studies in parts of isolated Africa where noise levels are very low show that people in these areas have almost no hearing problems, even among the aged.
        (3) Medical checkup will usually reveal hearing loss; and if diagnosed early, it can often be corrected.

    c. Eyestrain and headaches from noise exposure

    d. Noise as a hindrance

        (1) Watchmakers working on wristwatches, surgeons performing an operation, golfers making a putt are distracted by noise.
        (2) In these cases, noise makes the eyes dilate, requiring a rapid change in focus.

    e. Lack of sound awareness

        (1) Dangers in becoming used to a noise are still uncertain.
        (2) Indications are that minimal background noise may lessen our sensitivity to even louder sounds.

    f. Heart and blood vessels affected

        (1) Increased cholestrol and blood pressure.
        (2) Small blood vessels constrict and slow blood flow.

2. Emotional effects

    a. Mental stress and strain from annoying noises (such as constant clacking of typewriters)
    b. Family reactions to increased home noises as indicated by studies:

        (1) A gap in interfamily communication
        (2) Irritability
        (3) Short attention span and hyperactive children

- c. Anger possible result of continuous unpleasant, unwanted sounds
- d. Stress, tension, loss of sleep, and nervous strain; final result may be "nervous breakdown"

  - (1) A study of patients in London's mental hospital shows that more of them come from an area around Heathrow airport.
  - (2) American researchers have found that people exposed to uncontrolled or uncontrollable noise become frustrated, irritable, and unable to perform at top efficiency.

3. Financial effects

- a. Billions of dollars per year spent for absenteeism and industrial accidents.
- b. Lower efficiency rate in factories with high background noise

D. Solutions to noise pollution

1. What government can do

- a. Local ordinances concentrated in two areas:

  - (1) Noise from motor-driven vehicles--These laws restrict the use of automobiles with mufflers that are not in good working order. (Some Alabama cities restrict the use of the horn except in case of emergency traffic conditions.)
  - (2) Noises that become a public nuisance--Tuscaloosa has such a law. The most common noise abatement laws in Alabama restrict speaking through a megaphone, soundbox, amplifier, or extremely loud radios, etc.

- b. Enforce existent community laws regarding discharging firearms or firecrackers
- c. Strengthen local noise abatement laws
- d. Enact building codes such as New York City's (Require ceilings, doors, and windows to be properly insulated against inside and outside noise)
- e. Require jet engines be made quieter, airports be built away from residential areas, leave buffer zones of three to five miles around an airport
- f. Enact proposed bills giving EPA authorization to put noise ratings on machines, set standards for transportation noise

2. What industry can do

    a. Design and manufacture quieter products

        (1) Experiments are being conducted with rubberized bumpers on metal trash cans.
        (2) The construction industry is experimenting with a muffled jackhammer that costs less than unmuffled ones and produces 25 percent less noise.
        (3) Tool companies are experimenting with less noisy rotary pavement cutters.
        (4) The Wankel engine is being tested in an effort to reduce noise pollution of motors.

    b. Recognize that worker efficiency and safety result when industrial money spent on noise abatement

3. What you can do

    a. Public awareness of noise pollution effects needed
    b. Noise Abatement Society prominent in England
    c. Individual's responsibility to noise abatement

ACTIVITIES

1. Use a cassette recorder to tape a number of sounds. Let the students identify them in class. How much do we depend upon our sense of hearing (sirens, train whistles, etc.)? What are the effects of loud constant noises on our sense of hearing? How do prolonged loud noises affect us in other ways?

2. Use a cassette to record the noises of a typical home or school day; play them in the classroom to reinforce the point that we are a noise-oriented society. Poll the students to find out how many do their homework with the radio, TV, or stereo playing.

3. Go to three different places in your community. Take along a watch and a notebook. Time yourself to stay in each place the same amount of time. List all the sounds you hear. Classify the sounds you hear as to high-pitched sounds, medium-pitched sounds, and low-pitched sounds.

4. Use a tape recorder. If possible, get one that runs on batteries. Go out into a busy area and record the sounds. Turn on the tape recorder for five minutes. During that time, write down the sounds you hear. When the five minutes are up, play back the tape. Compare the tape with your list.

5. Conduct a "Man on the Street" survey asking the following question: "What do you consider the worst noise problem in your community?" Find out about individual differences in your classroom.

6. Invite a member of your community planning commission to visit your class. Ask him to discuss noise pollution problems in your community.

7. Visit a store that specializes in the sale of automobile tires. Find out whether it is possible to make tires which create less noise.

8. Visit your city planning commission and find out which streets and roads cannot be used by commercial vehicles.

9. If you live near a U. S. Air Force Base or commercial airport, ask a representative from the Public Information Office to visit your class to discuss the supersonic boom.

10. Find a lawyer who is familiar with the laws that protect employees against noise. Ask the lawyer to visit your class to discuss past legal actions that have been taken against noisy companies.

11. If there is a large factory or office near your school, ask a representative from the company to visit your class to discuss steps that have been taken to reduce the noise problem in the office or factory.

12. Ask a representative from the Department of Public Health to visit your class to discuss hearing conservation.

13. Visit a local automobile repair shop. Ask the mechanic to show you ways that soundproofing has been added to automobiles. Ask a mechanic to show you parts which can and often do become noisy.

14. If your community or county has a noise abatement committee, ask them to send a representative to visit your class to discuss community and statewide noise problems.

CHAPTER EIGHT - WATER POLLUTION

A. The importance of water

1. Importance of water in history

    a. Man's existence dependent on fresh water
    b. Industrial, commercial, and agricultural activity of the earth located near water
    c. Earliest cities in river valleys (such as the Yangtze in China and the Tigris and Euphrates in present-day Iraq)

2. Importance of water in our own history

    a. Rapid development of U. S. due to abundant water supply
    b. Abundant water supplies still necessary for continued city and industrial growth
    c. America's 100 largest cities on or near dependable water supplies

3. Early attempts at water pollution control neither practical nor enforced

B. Supply and demand for water

1. Available fresh water supply in United States constant at about 650 billion gallons per day

    a. Increased need for water due to industrial, agricultural, and city growth
    b. More than 415 billion gallons of water consumed in 1971 per day (Visual 22)

2. Use in industry

    a. Thirteen times as much water used by today's industry as in 1900, accounting for approximately one-half of water used daily in U. S.
    b. Examples of water use in industry:

        (1) To produce one ton of paper requires 50,000 gallons of water.
        (2) To produce one ton of synthetic rubber requires 666,000 gallons of water.
        (3) To produce one automobile, more than 500,000 gallons of water are used.
        (4) A rayon and nylon industrial plant in Mobile County uses 8,000,000 gallons of water per day.

3. Agricultural demands for water tremendous; for example, 500,000 gallons of water are needed to produce one ton of wheat or corn
4. Use of water in cities

    a. Ten percent of daily U. S. water consumption in cities
    b. Individual water consumption now four times greater than in 1900 (Visual 23)
    c. Water requirements for Birmingham:

        (1) Domestic water use has risen from 65 million gallons per day in 1965 to 85 million gallons per day in 1970.
        (2) Industrial water use has risen from 48 million gallons per day in 1965 to 74 million gallons per day in 1970 from public water supplies plus several million gallons per day from private wells.

    d. Decreasing supply of useable fresh water despite increasing demands

5. Pollution increase (Visual 24)

    a. Natural decomposition of early water pollution
    b. Complex industrial wastes, productive and wasteful agricultural systems, and growing metropolitan centers increase sewage waste; approximately 50 billion pounds of pollutants dumped back into water
    c. Approximately 200 million gallons of daily municipal waste in Alabama; 40 percent dumped into the water untreated or inadequately treated
    d. Untreated waste affects the balance of nature two ways:

        (1) It damages or destroys the life support system of man.
        (2) It contaminates the water with matter or chemicals that allow disease to develop.

6. Effects of chemicals on water

    a. Algae growth in water due to addition of excessive amounts of phosphorus, nitrates, and detergents
    b. Dead algae act as breeding place for bacteria
    c. Diseases such as diarrhea, hepatitis, dysentery, and typhoid contractable by drinking water or eating fish from bacteria-laden water

C. Some effects of fresh-water pollution

1. All pollutants either natural or man-made

   a. Natural pollution (in the form of decaying plant and animal matter, sediment and minerals washed into streams by erosion) cleared through natural processes
   b. Man-added pollutants resist organic breakdown, present greater hazard

2. Man's pollution evident

   a. People in all walks of life affected
   b. Specific examples:

      (1) The Hudson River that flows through New York City has raw sewage dumped into it from cities and industry all along the river. (Reports are that a nail immersed in water for several months will not rust because there is so much pollution. In 1971 eight children contracted typhoid fever from eating a watermelon they had found floating on the Manhattan side of the river.)
      (2) Jefferson County, Alabama, has problems similar to the Hudson River pollution. (In Valley Creek, for 235 days of the year more than 50 percent of the flow is municipal and industrial waste; a second creek in Jefferson County contains more than 50 percent municipal and industrial waste flow for 320 days of the year.)
      (3) Lake Erie has become so polluted that the amount of commercial fish caught in the lake has decreased from 23 million pounds in 1921 to only 12,000 pounds per year in 1971. (Only the more hardy but undesirable fish and leeches exist. Residents were warned not to fish, ski, boat, or swim in Lake Erie. Those who have boating permits are required to be innoculated against certain diseases. The Cuyahoga River, which flows into Lake Erie, has been declared an official fire hazard because of its oily chemical content.)

D. Identifying levels of pollution in an area

1. Pollution patterns enable understanding of effects and treatment (See chart "Pattern of Pollution.")

   a. An increase in size of pollution due to continuous dumping of untreated or inadequately treated waste
   b. One- to five-mile-long polluted area resulting from the dumping of wastes or heated water into river by ten to twenty chemical industries

   c. Inability of water to rid itself of waste prior to being dumped into sea result of too much waste dumped into waterways

2. The Hudson River--continuous pollution

   a. Never progresses beyond Stage II of purification (See chart "Pattern of Pollution.")
   b. Estimated that 60,000-square-mile area of Northern Atlantic Ocean covered with Hudson River garbage

PATTERN OF POLLUTION

I. Maximum Pollution Area	II. Odor Pollution Area	III. Algae Growth Area	IV. Final Cleansing
1. Usually occurs around the source of dumpage and usually terminates within two hundred yards of the source around an outlet pipe, etc.	1. Characterized by odors of decay. Area of coverage is indeterminable.	1. Area of coverage indeterminate, but easily recognized as a result of presence of water plants (algae).	1. Area of coverage indeterminate.
2. Water oxygen content is at its lowest point.	2. Very low oxygen content in water	2. Intermediate quantity of oxygen available in water.	2. High levels of oxygen as result of the high concentration of algae from area III.
3. Considerable water discoloration as a result of high pollution concentration.	3. Considerable water discoloration as result of high pollution concentration.	3. Polluted water is discolored to green or gray-green not from the pollutants in the water, but from plant algae growth.	3. Very little discoloration.
4. Little or no observable aquatic life.	4. Observable aquatic life consists primarily of lower forms of worms and some plants.	4. Intermediate life forms, snails, etc.	4. Much observable aquatic life.

E. Some types of water pollution (Visual 25)

1. Trace metals

a. Mercury and arsenic reaching harmful amounts in food and water supply
b. Significant natural levels of mercury to surface and underground waters increased through erosion

(1) As mercury is exposed to certain types of bacteria it is changed to a deadly form, methylmercury.
(2) Methylmercury is absorbed into fish or can remain undetected in clear water, thus posing a threat to mankind.

c. Use of mercury processing in industry

(1) The major users of basic mercury are the chemical, plastic, electronics, food processing, and pulp and paper industries.
(2) Mercury is used by the paper and pulp industry to clean equipment of the fungi and bacteria growing on continuously wet logs.
(3) Besides the pulp and paper industry, a large user of mercury is the chlorine and caustic industry, which--like the pulp and paper industry--releases the mercury untreated into the waterways.

d. Effect of mercury waste on Alabama waterways

(1) Several areas were closed to commercial fishing, which, in turn, affected the economic and tourist condition, especially of the Pickwick Lake area.
(2) Cities may draw water from Pickwick Lake, purify it, and pipe it as drinking water; but it still may contain mercury or methylmercury, which is not affected by normal purification.

e. Maximum allowable concentration of methylmercury in foods--0.5 ppm (parts per million)

(1) Present methylmercury concentration in tomatoes, eggs, and meat is approximately 0.1 ppm.
(2) Methylmercury in food is usually the result of spraying, dipping, or placing in fungicides as a decay retardant.

f. Mercury believed to accumulate in body; expelled slowly

    (1) Man is the only creature in which mercury collects in the brain; in other life forms it is found in the muscles.
    (2) When a multiplier effect is set into progress, mercury can become a major threat causing blindness, deafness, mental disorders, lack of muscle coordination, and death.

g. Greater danger potential from arsenic--known carcinogen or cancer-causing substance

    (1) Man-added arsenic is in the form of pesticides sprayed on fruits and vegetables.
    (2) When it rains, pesticides wash into water supplies.

h. Maximum allowable consumption of arsenic--0.01 ppm

    (1) Larger than normal quantities cause irreparable damage to the liver and kidneys because the liver fails to filter these particles.
    (2) After passing through the kidneys, arsenic is stored in fatty tissue; if weight loss is recommended, it should be gradual as release of too much arsenic into the body might result in severe damage to body organs or death.
    (3) A prolonged high level of arsenic results in the possibility of cancer developing.
    (4) Other carcinogens in addition to arsenic are beryllium, chromium, and benzopyrene (a petroleum derivative).

2. Nonmetallic chemical pollutants in our water systems

    a. Two basic types used in agricultural areas--chlorinated hydrocarbons and organic phosphates
    b. Chlorinated hydrocarbons

        (1) These include pesticides such as DDE, DDT, dieldrin, and endrin.
        (2) Chlorinated hydrocarbons have a long-lasting kill power on insects.
        (3) DDT is effective for twenty to thirty years, and for about twelve years it is as powerful as when first applied.
        (4) All chlorinated hydrocarbons have this half-life index.
        (5) The Tennessee Valley, Black Belt, and southern one-third of Alabama have used DDT for the last twenty-five to thirty years to fight the boll weevil.

    (6) It is likely water supplies are contaminated (especially rural), and these insecticides also accumulate in the fatty tissues of the body.

  c. Organic phosphates

    (1) These include parathion, malathion, azodin, TEPP, and others.
    (2) These are poisonous to insects and dissolve into harmless substances in the environment within about three months after use.
    (3) Like chlorinated hydrocarbons, they are hard to detect in water.

3. Pollution from petroleum

  a. Important as fuel

    (1) Petroleum is usually transported by shipping, but in the process more than half a million tons are dumped into water each year.
    (2) Intentional dumping occurs when a ship empties its ballast for cleaning once it reaches port.
    (3) Spilled petroleum is hard to eliminate, floats great distances, is a fire hazard, and coats the shore line.

  b. Petroleum pollution threat to aquatic life

    (1) Surface feeding fish swim into the floating oil, their bodies and gills become coated, and they die or become unfit for human consumption because their flesh absorbs the oil.
    (2) As floating oil moves landward, toxic oil particles bring death to marine life and beds of seaweed.

  c. Benzopyrene threat to man through contaminated water and aquatic life

4. Sewage

  a. Twenty-five percent of all pollutants dumped by cities and towns
  b. Effects of sewage dumped into water:

    (1) Sewage depletes the oxygen supply in water and acts like detergents and fertilizers to stimulate algae growth.
    (2) Waters become contaminated with infectious bacteria and organisms carried in sewage.
    (3) Swimming, fishing, or drinking such water may cause typhoid, cholera, or hepatitis.

c. Danger to recreational areas due to presence of coliform bacteria

(1) Such bacteria is found where there is the presence of human wastes.
(2) Wakiki Beach in Honolulu, Hawaii, sometimes has a bacterial count twice as high as it should be for safe swimming.
(3) The coliform bacteria count of the Potomac and Delaware Rivers has been, at times, 433 and 205 times higher than safe levels.

5. Detergents and fertilizers

a. Possibility of a lake evolving to a bog and/or dry land if algae growth continually stimulated by phosphorus (in detergents) and nitrogen (in fertilizers)
b. Nitrogen and phosphorus resistant to breakdown and removal by ordinary treatment processes
c. Problem with ordinary treatment processes

(1) The usual treatment processes actually change the organic forms of phosphorus and nitrogen into a mineral form.
(2) The mineral form of nitrogen and phosphorus results in rapid plant growth, requiring the use of an expensive chemical counteraction to check algae growth.

6. Concentrated livestock waste

a. Waste riddance problems resulting from large numbers of cattle, swine, and sheep raised in feedlots
b. Examples of concentrated livestock waste:

(1) One Alabamian milks 500 cows twice daily; an average cow produces 45 pounds of waste a day, making a total of 11.2 tons of waste a day.
(2) In North Alabama, a city three miles downstream from a large poultry farm (where untreated waste washes into streams leading into the river) must use seven to nine times the normal level of chlorination needed to purify its drinking water.

7. Thermal or heat pollution

a. Threatens man's economy rather than his health

b. Electric power plants main source of thermal pollution

   (1) Turbine blades rotate in electric power plants changing water, coal, petroleum, or nuclear fuels into mechanical power.
   (2) Generators convert mechanical power into electricity.
   (3) Large quantities of energy are lost as heat when energy goes through various conversions.
   (4) Water is used to cool the machinery.

c. Increased demands for electricity, increased demands for coolant-water

   (1) Seventy-five percent of thermal pollution is from energy-generating plants.
   (2) The Mahoning River in Ohio frequently has risen above 130° to 100° F and has risen above 130° F while snow and ice covered the land.

d. Effects of thermal pollution

   (1) Each 20° F increase in water temperature doubles the body processes of aquatic life so that with great temperature increases the prolonged strain kills aquatic life such as fish, oysters, and shrimp.
   (2) Fish lay their eggs in the spring, with the natural changing of water temperature; but heat-polluted water causes them to lay prematurely and the eggs die.
   (3) Fish appetites are directly related to water temperature.
   (4) Fishing areas can be destroyed, resulting in economic depression in areas dependent upon such industry.

F. Importance of fresh-water pollution and pollution of the oceans

1. Water acidity where coal is mined

2. Water salinity where salt water seeps in or fresh water flow too small to keep salt water out, such as in Californi, Louisiana, and southern Florida

G. Fresh-water pollution's effects on the oceans

1. Threat to man's present and future seafood supply

   a. Organic material released into water upon death and decay of grasses growing on coastal flat lands.
   b. Organic material provides food source to small aquatic animals.
   c. Larger aquatic animals feed on smaller aquatic animals.
   d. Cycle occurs in area ten to twenty-five miles offshore.
   e. Fresh-water pollution dumped into this area.

2. Economic loss in Pensacola, Florida

   a. Serious economic losses in commercial fishing and tourist industry
   b. Fish kills result of dumping industrial chemicals into Escambia Bay

3. Man's oxygen supply may be endangered

H. Some solutions to the water pollution problem

1. Identify available organizations and technical resources.
2. Determine whether total pollution elimination or reduction to a safe consumption level necessary

I. Government's role in solving water pollution problems

1. Organizations with legal jurisdiction over sources of water pollution (Visual 26):

   a. Federal government
   b. State government
   c. Local government

      (1) The 1970 Water Pollution Control Act is a federal law delegating the power to the Secretary of the Interior to develop comprehensive programs to eliminate or reduce pollution of interstate waters and their tributaries.
      (2) Act No. 1260 passed in Alabama in 1971 is as comprehensive as the federal law dealing with water pollution.

2. Continual water pollution despite laws.

    a. Refusal of polluters to accept responsibility; blame others
    b. Refusal to correct pollution created

3. Laws not enforced

    a. Insufficient personnel and money to enforce the laws; one man responsible for checking mining operations for acidity and sediment added to water supplies in Alabama
    b. Lack of operating funds

J. Comprehensive river basin water standards and pollution control

1. Only the national or state governments possess overall perspective necessary for preparation and support of comprehensive river basin pollution control programs
2. Example of how comprehensive river basin pollution control program would work (using Tallapoosa Valley system)

    a. The Tallapoosa flows through unused forests from point of origin to Montgomery, which provides city's main source of water.
    b. Comprehensive control standards upstream would mean minimum water treatments for Montgomery consumption.
    c. Utilization of Coosa and Tallapoosa water possible in Selma if extensive waste control measures used by Montgomery
    d. Water leaving Selma suitable for agricultural use and wildlife use in area between Jackson and Mobile

3. Control of river basin pollution under single agency
4. To date no satisfactory solution; too many local governments involved

K. Government research

1. NASA - trained men and equipment utilized in solving water pollution problems
2. Expanding enforcement
3. Establishing public information centers to keep people informed about the laws
4. Taxing polluters until corrective measures are taken

L. Industries' role in solving water pollution problems

1. Many industries leading way in development of water pollution control measures

    a. Modified cooling system in southern California steel plant uses Los Angeles water waste to cool furnace heat also helps in speeding up organic waste decay
    b. East coast steel mill uses sea water in cooling system--the first time salt water used in major U. S. industry

2. Water treatment systems in use by several Alabama industries
3. Agricultural industries' discovery that animal waste can be processed to produce methane or natural gas
4. Industries recognizing limits of technology as applied to their production; investing millions of dollars in research and control of water waste

M. Municipalities' role in solving water pollution problems

1. Untreated municipal waste being dumped into Alabama's waterways--one of the state's biggest water pollution problems
2. Upgrading treatment facilities best way to solve problem
3. Bans on the sale of phosphate detergents in some cities as an effort to help eliminate municipal waste problems

N. The individual's responsibility in water pollution control

1. Individual's responsibility to decide on effort he wants to make
2. Organizations formed to combat water pollution (examples: Sierra Club, National Wildlife Federation)
3. Actions taken by individuals and organizations

    a. Court suits (examples: the Sierra Club bringing suit against mining companies building roads through the redwood forest areas of California)
    b. Fishermen's reporting of most fish kills
    c. Initiation, by individuals, of drives to clean up rivers
    d. Awareness of the laws, in whatever action taken; be sure to know the laws

SOME SUGGESTED ACTIVITIES

The following activity is presented with permission of the Environmental Education Center, ESEA Title III, Madison County Schools, 13 Veterans Drive, Oteen, North Carolina.

1. Sanitary Landfill Exercise

Materials needed:

- 1 large container with lid (jar)
- 1 tea bag
- 1 styrofoam square
- 1 swatch quilted cotton
- 1 piece plastic
- 1 paper square
- 1 aluminum foil square
- 1 piece clear plastic wrap
- 1 square wax paper
- 1 piece of bread
- 1 metal coke cap
- 1 swatch polyester fiber

Fill the jar with soil loosely packed. Insert the materials along the sides of the jar where they can be observed. On the outside of the jar label the materials included. Keep the labels small so they will not obscure the materials. This represents a sanitary landfill, a method of garbage disposal. Keep an account of the changes occurring in the "minifill" using the following chart:

SANITARY LANDFILL OBSERVATIONS

Once a month observe the following materials and record your observations:

SANITARY LANDFILL EXERCISE

MATERIALS	MONTHS	CHANGES OBSERVED
Tea Bag		
Styrofoam		
Plastic		
Paper		
Aluminum Foil		
Quilted Cotton		
Clear Plastic Wrap		
Wax Paper		
Bread		
Metal Cap		
Synthetic Fiber		

2. Examine the contents of the wastebasket in the classroom. Dump the contents on a table covered with newspapers. Divide the trash into the categories of glass, paper, metal, and other. Consider the following:

    a. What kinds of wastes do we have here?

    b. What will happen to it?

    c. What could be recycled?

    d. Why do we have wastebaskets and trash containers? Then why do we need litterbugging laws?

    e. Do you know anyone who has been fined for littering?

    f. What are the penalties for breaking litterbugging laws?

    g. Check with the local law authorities to see how many arrests or fines have been assessed against litterers.

    h. Try to find out how much it costs yearly in tax dollars to clean up highway litter on the local and state levels.

3. Create a bulletin board of local pollution problems, using pictures that have been taken in the community.

4. Create a bulletin board of pictures comparing natural pollution and man-made pollution.

The following four activities are adapted from the Environmental Science Study Curriculum, ESEA, Title III Project, P. S. Jones Junior High School, Washington, North Carolina:

5. Prepare handout copies of a town such as the one attached. Have students list all of the polluters they can see on the diagram.

6. Before class sketch on the board an outline of a town with fields, rivers, etc. On a table have the following:

    a. A large jar (one gallon) or aquarium filled with tap water and labeled "river"

    b. A small dish of sand or soil

    c. Inorganic trash

    d. A dropper bottle of methylene blue or other biodegradable dye

    e. A dropper of milk

f. A dish of organic garbage

g. Detergent

h. A dish of fertilizer pellets or a dropper bottle of liquid fertilizer

i. A small jar of tap water for each creek and drainage ditch shown in the sketch. Label the jars as "creeks" or "drainage ditches."

j. Dropper of gasoline

k. A pile of leaves and stems

l. Dish of iron filings or other metal

During class pass out cutouts of the polluters as sketched on the following two pages or use pictures cut from magazines. Have students come up one at a time and tape each cutout on the board in a logical location. Then let each individual explain how their cutout pollutes. As each student returns to his desk, let him go by the tables and add a sample of his pollutant to the river and/or creek. A student may be allowed one minute to give specific information about his pollutant. When all students have finished, pour the "creeks" and "ditches" into the river. Is this our town's river?

7. To demonstrate that chemicals like lead, DDT, and mercury can be dangerous even in small quantities, add iron filings to a beaker of water. The filings represent DDT or any heavy metal. A small magnet can be suspended on a string and floated in the water to represent a fish. The fish concentrates the DDT by feeding. To extend the concept, another larger magnet can be suspended to pick up the small magnet. This can be used to demonstrate the effects on higher carnivores.

8. Take a field trip to the local water and sewage treatment plant and/or a local industry's water treatment facility.

If visiting the local community's water and sewage treatment facility, the following may be placed on a stencil for each student:

Municipal Water Treatment: City of ______________________________

I. Water Purification for Drinking:

A. Where does our drinking water come from?

B. Is there as much water available as there used to be?

C. Is the water supply as pure as it used to be?

D. Who receives treated water from this plant?

E. What is the cost of cleaning the water?

II. Sewage Treatment

A. How does the sewage get to the plant?

B. How are the large items of trash removed?

C. How are biodegradable materials (organic wastes) removed?

D. What is done with the wastes removed from the water?

E. How could our sewage treatment be improved? Is it going to be improved?

F. How much does it cost to treat the sewage?

G. How do large rainfalls affect sewage treatment plants?

H. What kind of treatment does our city have:

Primary _____ Tertiary _____

Secondary _____ None _____

I. What does not get removed by our treatment plant?

9. The following activity is presented with permission of the Environmental Education Center, ESEA, Title III, Madison County Schools, 13 Veterans Drive, Oteen, North Carolina.

Cleanest Shirts In Town

by

Art Buchwald
(an adaptation in dialogue)

Narrator: Everyone talks about water pollution, but no one seems to know who started it. The history of modern water pollution in the United States dates back to February 28, 1931, when Mrs. Frieda Murphy leaned over her back yard fence and said to Mrs. Sophie Holbrook. . .

Mrs. Frieda Murphy: You call those shirts white?!?

Mrs. Sophie Holbrook: (blushing) They're as white as I can get them with this ordinary laundry soap.

Mrs. Murphy: What you should use is this Formula Cake soap which guarantees against the dull washtub gray look.

Narrator: Skeptical but adventurous, Mrs. Holbrook tried the Formula Cake soap, which happily did take the gray out of her husband's shirts. But what Mrs. Holbrook didn't know was that after the water was drained from the tub, it emptied into the Blue Sky River, killing two fish. Three years later Mrs. Murphy leaned over the fence and said to Mrs. Holbrook. . .

Mrs. Murphy: I know it's none of my business, Honey, but are you still using that Formula Cake soap?

Mrs. Holbrook: Yes, I am.

Mrs. Murphy: Well, no wonder your husband's shirts have a dirty ring around the collar.

Mrs. Holbrook: (sighs) I can never get the dirt off the collar!

Mrs. Murphy: You can now if you use Klonk Soap Chips. They were designed especially for collar dirt. Here, you can have my box!

Narrator: Mrs. Holbrook used the Klonk and the next time her husband put on his shirt he exclaimed about the clean collar. "How did you get it so clean?" he asked.

Mrs. Holbrook: (coyly) That's my secret, (and in a whisper) and Mrs. Murphy's!

Narrator: Unbeknownst to Mrs. Holbrook, the water from Klonk Soap Chips prevented any fish downstream from hatching eggs. Four years later, Mrs. Murphy was hanging up her shirts and Mrs. Holbrook questioned her.

Mrs. Holbrook: How did you ever get your cuffs so white--surely not with Klonk?

Mrs. Murphy:	Not with ordinary Klonk--I used Super Fortified Klonk with the XLP additive. You see, Super Fortified Klonk attacks dirt and destroys it. Here, try it on your shirts.
Narrator:	Mrs. Holbrook did and she discovered her husband's shirt cuffs turned pure white. What she couldn't possibly know was that it turned the river pure white as well. The years went by and Mrs. Murphy died. Her daughter-in-law took over the house. Mrs. Holbrook noticed that the daughter-in-law always sang as she hung up her wash. She inquired.
Mrs. Holbrook:	Why do you always sing?
Mrs. Murphy Jr.:	It's because of this New Dynamite detergent. It literally dynamites my clothes clean. Here, try it, and then let's go to a movie, since Dynamite detergent takes the drudgery out of washing!
Narrator:	Six months later the Blue Sky River was declared a health hazard. One evening as Mr. Holbrook was walking home from work, he accidentally fell into the Blue Sky River, swallowed a mouthful of water and died immediately. At the funeral services the minister noted. . .
Minister:	You can say anything you want about Holbrook, but no one can deny he had the cleanest shirts in town.

1. Discussion of dialogue

    a. What was the main concern of the two women?

    b. What are the ladies a victim of?

    c. How does advertising influence each of us?

    d. Which comes first, supply or demand? That is, are we "sold" products on demand or does advertising first make us feel a need for the product?

    e. What didn't Mrs. Holbrook realize?

    f. Are Mrs. Holbrook and Mrs. Murphy really typical housewives?

    g. Why is this society so hung up on white laundry?

2. Students may want to act out the script.

10. Prepare radio or TV public service announcements regarding air, water, or noise pollution.

The following activity is used with the permission of the Environmental Education Center ESEA Title III, Madison County, North Carolina:

11. Take pictures of the different types of housing found in your community. Mount the pictures on a poster and label each as to what type of house it is.

    a. What environmental factors must be considered when building a home?

    b. How would you decide what type of heating system to use?

Type	Advantages	Disadvantages
Oil Furnace	__________	______________
	__________	______________
	__________	______________
Coal Furnace	__________	______________
	__________	______________
	__________	______________
Natural Gas	__________	______________
	__________	______________
	__________	______________
Electric Heat	__________	______________
	__________	______________
	__________	______________
Wood Fireplace	__________	______________
	__________	______________
	__________	______________

c. Which would you use?

d. What kinds of materials were used to build the houses that were photographed?

e. How can we build more homes and still conserve our natural resources?

The following activity is included from the Environmental Science Study Curriculum, ESEA Title III Project, P. S. Jones Junior High School, Washington, North Carolina:

12. Divide the students into groups and have each group construct a collage on poster board or the sides of a box that displays the group's idea of what ecology is. Let each group select a speaker to explain its collage to the class or allow the groups to exchange collages and try to explain what they think each other's definition of ecology is, based upon their collection of pictures. Allow the originating group to verify the explanation or defend the pictures that have been misinterpreted.

13. Choose ten careers or occupations related to your environmental study. Let students select from a list the person most nearly described. Example:

Who Am I?

(Refuse collector)	a. I remove trash and garbage from homes and businesses to help control litter and safeguard health.
(Forest ranger)	b. I help to protect animal and plant life from fire, disease, and man.
(Architect)	c. I plan and design structures so they will be functional and compatible with surroundings.

The following activity is presented with permission of the Environmental Education Center, ESEA Title III, Madison County Schools, 13 Veterans Drive, Oteen, North Carolina.

14. Create a role-playing situation in which the class takes a local issue concerning the use of a natural resource with which they are familiar. The students could study:

a. The lawmaking process

b. The weighing of advantages and disadvantages before reaching a decision

c. The practice of influencing lawmaking by:

(1) information

(2) hearing from voters

(3) organized groups; lobbies

(4) individuals of influence

CHAPTER NINE - DRUG ABUSE PROBLEMS

(A Drug Education Resource Guide, "IDEAS," Bulletin No. 11, State Department of Education, is available upon request. See resource agencies in Appendix.)

A. Alcohol

1. Use of alcohol creates social and economic problems

   a. Involves problems in family living, highway safety, law enforcement, economic loss in industry, juvenile delinquency, and poverty
   b. Most accept fact we have alcohol problem though many not convinced it is yet a major problem

2. Alcohol usage not new to society

   a. Drinking associated with early man, his sacred feelings, magic, ancestor worship, religious rituals, etc.
   b. Drunkenness condemned in biblical times
   c. Colonial Americans drank mainly wine and beer
   d. By mid-1850s drinking in United States became more of social tavern-type activity

3. Campaigns against alcohol usage

   a. Campaigns against moral decay led by religious and civic groups; also urged concern for health

      (1) Temperance leagues were formed.
      (2) "Women's Rights Movement" was led by Carrie Nation. (Convinced of God's appointment of her to abolish saloons, she led public prayers and held lectures, wrecked saloons, was arrested for disturbing the peace, and earned bail by selling replicas of her hatchets.)

   b. Prohibition

      (1) Prohibition was in part the result of Carrie Nation's campaign.
      (2) People supposedly were deprived of alcohol for thirteen years.
      (3) Disobedience to law led to gangsterism, lawlessness, bootleg whiskey.
      (4) Prohibition (18th Amendment) was repealed by 21st Amendment.

4. Problems in use of alcohol
    a. According to speech by Senator Harold Hughes, 6.5 million chronic alcoholics in America; equal number of problem drinkers
    b. Highway deaths each year attributable to alcohol--25,000
    c. An estimated 50 percent of nation's prisoners behind bars because of alcohol

5. Early misconceptions about alcohol
    a. Believed to be a good medicine, good food, and a stimulant
    b. Alcohol no longer accepted as good medicine; has no vitamins, minerals, or body building materials; is depressant, not stimulant

6. Reasons people drink, as given by a group of teenagers
    a. Reasons teenagers drink, as listed by teenagers:
        (1) Desire to act like adults
        (2) To be like the group
        (3) To experiment, curiosity
        (4) To oppose parental authority
    b. Reasons others drink:
        (1) To accompany meals and satisfy thirst
        (2) For relaxation
        (3) To celebrate
        (4) To overcome a feeling of inferiority
        (5) To relieve frustration
        (6) To escape nagging problems

7. Actions against alcoholics
    a. Little being done at present
        (1) Only a small percentage of arrested alcoholics are convicted.
            (a) Thirty-six percent of those arrested are never tried in court.
            (b) Twenty-seven percent have charges reduced to lesser penalties.
            (c) Nine percent are dismissed.
            (d) Twenty-three percent are acquitted.
            (e) Only five percent arrested for drunk driving are convicted.
        (2) Juries tend to render a verdict of "not guilty."

b. Future federal assistance may come from a congressional bill up for approval which would use revenue from federal liquor taxes for highway safety and employ use of alcohol breath test, etc.

c. Federal grant awarded to Alabama on June 16, 1972; consisted of $589,488 for treatment of state's problem drinkers

(1) The State Department of Mental Health is to administer help to alcoholics.

(2) The number of known alcoholics in state is said to be 49,253.

B. Tobacco

1. Description of plant

a. Native American plant related to Irish potato, garden pepper, tomato, eggplant, petunia

b. Annual plant capable of yielding a million seeds

c. A tall plant with broad leaves, when fully developed

2. Early usage in Americas

a. Examples of early users:

(1) Natives found by Columbus

(2) Aztecs

(3) Incas

b. Virginians encouraged to grow tobacco by John Rolfe because:

(1) Tobacco crop provided wealth for colony.

(2) Some colonists felt that use of tobacco made them more socially acceptable.

(3) Tobacco was used as a medication.

3. Disapproval of usage

a. Selling of tobacco prohibited in fourteen states in 1921

b. Bills introduced in Congress to forbid usage

c. National campaign against usage after World War I

4. Effects on body with tobacco usage

a. Advisory committee appointed by Surgeon General of United States Public Health Service on October 28, 1962, to study available information on smoking

(1) Information was sought through animal experimentation, clinical and autopsy studies, and population studies.

(2) Results of study:

(a) The death rate was about 70 percent higher for smokers than nonsmokers.
(b) The death rate increased with the amount of tobacco smoked.
(c) The death rate of smokers compared to nonsmokers was higher at an early age.
(d) The death rate of cigarette smokers compared to nonsmokers was higher for those who started smoking under age 20 than for those who started after age 25.
(e) The death rate of ex-cigarette smokers increased with number of years of smoking and was higher for those who stopped after age 55 than for those who stopped at an earlier age.
(f) Cigarette smoking is closely related to lung cancer.
(g) Risk of lung cancer increases with the continuation of smoking and the number of cigarettes smoked per day, but is diminished by discontinuing smoking.
(h) Cigarette smoking is the most important of the causes of chronic bronchitis in the United States and increases the risk of dying from chronic bronchitis and emphysema.
(i) It has been established that cigarette smokers have a higher death rate from heart disease than nonsmokers.
(j) Cigarette smoking is an important factor in the cause of cancer of the larynx.

b. Conclusion from research shows that harm brought to body would far outweigh any positive aspects in any tobacco-related fields.

C. Marihuana

1. Nature of drug

a. Found in flowering tops and leaves of Indian hemp
b. Areas where grown:

(1) Mexico
(2) Africa
(3) India
(4) Middle East
(5) United States

c. Slang terms:

   (1) Pot
   (2) Tea
   (3) Grass
   (4) Mary Jane
   (5) Hashish
   (6) Other names

2. History of drug and plant usage

   a. Used in China to relieve pain
   b. Used in India as medicine
   c. Used in United States Revolutionary War period in manufacture of twine, bags, clothing, paper, and rope
   d. Used in United States during prohibition of 1920s as substitute for alcohol

3. Effects of use

   a. Acts on brain and nervous system--increases heart beat, lowers body temperature, user becomes talkative, loud
   b. Reddening of the eyes
   c. Stimulates the appetite
   d. Dehydrates the body
   e. Audio and visual perceptions change
   f. Visual hallucinations

4. Federal Laws pertaining to marihuana usage

   a. To possess, give away, or sell marihuana is felony
   b. Various penalties for possession

5. The future for known marihuana users

   a. Colleges, trade schools, junior colleges will not accept known users.
   b. Police record follows user.
   c. Certain professions closed to marihuana users.

D. Depressants (Sedatives-Hypnotics)

1. Nature of depressant drugs

   a. Group includes barbiturates, the most widely abused depressant.
   b. Introduced into medicine in 1903 by two German scientists who called their discovery "Veronal."
   c. Veronal offered controllable means of depressing the central nervous system to any desired degree from slight sedation to deep anesthesia.

2. Effects of usage

   a. Report of the American Medical Association in 1937 in the article "Evils from Promiscuous Use of Barbituric Acid and Derivative Drugs" shows the following results of barbiturate usage:

      (1) Use of such drugs creates habit formation.
      (2) Such drugs are substituted for alcoholic beverages.
      (3) These drugs have been used for successful, as well as unsuccessful, attempts at suicide.

   b. By 1949, one-fourth of all poisoning cases admitted to hospitals due to acute intoxication from barbiturates; sleeping pills cause of more deaths than any other poison
   c. Withdrawal symptoms consist of convulsions and a psychosis resembling alcoholic delirium tremens

3. Chemical name:

   a. Pentobarbital (Nembutal)
   b. Secobarbital (Seconal)
   c. Amobarbital (Amytal)

4. Slang names:

   a. Yellow jackets
   b. Red devils
   c. Red bird
   d. Blue heaven

5. Medical uses of barbiturates

   a. Prescribed in small doses to induce sleep
   b. Treatment of acute anxiety
   c. Treatment of hyperthyroidism
   d. Treatment of high blood pressure
   e. Used in treating physical and mental illnesses

E. Amphetamines

1. History of use

   a. Use of cocaine by Incas
   b. First used in 1930 by the United States government to stimulate more productive war efforts by civilians and military personnel
   c. Major abuse and addiction through increased use after World War II

2. Effects of amphetamines

    a. Stimulates nervous system - person becomes excited, talkative, hands tremble, pupils dilate
    b. Loss of appetite - used for diet control
    c. Insomnia - used to control narcolepsy
    d. Drug psychosis - develops both auditory and visual delusions and hallucinations
    e. Effects of continued use - high blood pressure, abnormal heartbeat, possibly severe emotional disturbance, brain damage, hepatitis, heart disease

3. Amphetamines produced in various forms and colors
4. Chemical names:

    a. Amphetamine sulfate
    b. Dextroamphetamine sulfate

5. Slang names:

    a. Pep pills
    b. Wake-ups
    c. Eye-openers
    d. Co-pilots
    e. Truck drivers
    f. Bennies
    g. Cartwheels
    h. Benzies
    i. Roses
    j. Hearts
    k. Footballs
    l. Orangies
    m. Dexies
    n. Speed

F. Volatile Substances

1. Not considered drugs, but found on drug scene
2. Examples of solvents--such as glue, gasoline, paint thinner, etc.
3. Users inhale fumes

    a. Directly from container
    b. From bag or handkerchief covered with solvent

4. Effects of inhalation

    a. Excitement and exhilaration
    b. Staggering
    c. Blurred vision
    d. Slurred speech
    e. Tissue irritation

f. Nausea
g. Dizziness
h. Shakiness
i. Muscle spasms
j. Possible hallucinations

5. Medical problems associated with use of solvents

a. Death by suffocation
b. Severe anemia in those who have sickle-cell anemia
c. Damage to kidneys, liver, heart, blood, nervous system, and bone marrow

6. Controls on usage of solvents

a. Possession not a crime
b. Some local ordinances passed, but few in Alabama

G. Hallucinogens

1. Categories of hallucinogens

a. LSD
b. Mescaline
c. DMT
d. DET
e. Psycilocybin
f. THC
g. STP

2. LSD - best known hallucinogen

a. Most well-known and most potent
b. Is colorless, tasteless, and odorless
c. One ounce can produce 300,000 doses

3. Uses of LSD

a. Rehabilitation of criminals
b. Treatment of mentally retarded and schizophrenic children
c. Treatment of psychotic adults
d. Treatment of alcoholics
e. Many maintain that drug too dangerous to use

4. Results of LSD abuse

a. Chromosome alterations in white blood cells
b. Some malformation of babies believed due to usage
c. Changes in sense of perception
d. Psychological dependence

H. Opiates

1. History of use
2. Pharmacology
3. Depressants on the central nervous system
4. Morphine
5. Heroin
6. Codeine
7. Synthetic narcotics - Demerol, Darvon, and others
8. Rehabilitation and treatment

ACTIVITIES AND QUESTIONS

DRUGS

1. Draw cartoons regarding peer pressures to take drugs.

2. Role Playing - Create and act out everyday problems in which a student could turn to drugs or solve the problem in another manner.

3. Have students bring and play (screened) pop records involving drugs. Discuss.

4. Invite a member of the local Alcoholics Anonymous chapter to speak.

5. Have class prepare comparative time lines which could be drawn on market paper and placed on classroom wall. Topic--usage of drugs by people of early civilizations:

   a. Mesopotamians
   b. Egyptians
   c. Persians
   d. Greeks
   e. Romans
   f. Chinese
   g. Japanese
   h. Indians (India)

   After completion of time line, compare dates, reasons for use, etc.

6. Panel Discussion: "Why and how Aztecs and Incas used coca leaves as stimulants."

7. Find the following countries on the map and give governing regulations on legal and illegal importation of the opium derivatives into the United States:

   a. Turkey
   b. Iran
   c. Yugoslavia
   d. India
   e. China

8. Have a resource person discuss harmful effects of drugs on the athlete.

9. Have students improvise settings and role play the different reasons for drug abuse.

10. Discuss: What do you think conditions might be like in the United States if there were no laws to control the sale of drugs?

11. Discuss the fines and penalties involved if convicted of these offenses. Include in the discussion the extent of the penalties in regard to the number of offenses.

12. Study penalties for distributing drugs to minors.

13. Collect clippings from newspapers and magazines concerning raids and trials involving drug traffic and place these on a current events bulletin board.

14. Define misdemeanor and felony. What is the difference in the two terms and penalties that go along with each one?

15. Discuss the topic: "Is it the duty of the United States Government to help the drug addict become a useful citizen at the expense of the taxpayer?"

16. Invite members of the law enforcement agencies to speak on the subject of crime, law enforcement, and respect for law in the community. (Caution must be taken with this activity since negative attitudes toward law enforcement officers may have already developed. The teacher may want to discuss the class attitude with the law enforcement officer before he speaks to the class.)

17. Discuss the question: "What would be my reaction if I were the parent of an eighth grade drug abuser?"

18. Analyze the term "social acceptance."

19. Debate: Resolved, drug laws cause increased crime in our society. Drug laws will stop the abuse of drugs.

20. Evaluate the advantages and disadvantages of living in a society where there are no restrictions or controls on the use of drugs.

21. Give your reaction to a situation where the driver of an automobile you were riding in had been abusing drugs.

22. Research the number of accidents in your community in which drugs have been a factor.

23. Contact a local insurance firm to determine relationship between the conviction of drug abuse and insurance rates.

24. Research local plant sources of drugs: marigolds, periwinkle, oleanders, belledonna, resurrection fern, rhubarb, jimson weed, etc.

25. Contact resource personnel to explain beneficial uses of drugs (pharmacist, doctor, school nurse, mental health official).

26. Interview a chain smoker and report to class his reasons for smoking.

27. Conduct buzz session or discuss "What constitutes a healthy personality?"

28. Analyze liquor and beer ads for psychological and social appeal.

29. Have students construct crossword puzzles using drug terms.

30. Write argumentative compositions based on the following titles:

    a. A Pill for Every Problem.
    b. Should "Over-the-Counter" Drugs Be Under Government Control?
    c. Television Commercials Encourage a Drug-Oriented Society.
    d. Some Teens "Do Dope" Because of Their Parents.
    e. Will a Real Friend "Turn Me On" To Drugs?

31. Discuss importance of reading warning labels on chemical containers.

32. Identify authors and poets who were influenced by drugs and discuss their writings.

33. Divide into small groups to research and discuss symptoms of abuse of the following:

    a. Tobacco
    b. Depressants
    c. Volatile substances
    d. Stimulants
    e. Narcotics
    f. Marihuana
    g. Hallucinogens
    h. Alcohol

34. Explain how health is positively and negatively affected by drugs.

35. Discuss the unwarranted use of drugs by the athlete.

36. Leisure time and how it may lead to drug abuse.

37. Show how drug addiction may affect newborn babies.

38. Use "Drug Simulation Game": "Community at the Crossroads" from the Social Seminar (role playing). Available from: Drug Education Unit, Basic Sciences Section, State Department of Education.

39. Have a committee write to a snuff company inquiring about the history of that company or the production of snuff in the United States.

40. Project: From research show how drug abuse increased during the following wars:

    a. Civil War
    b. 1st and 2nd World Wars
    c. Korean Conflict
    d. Viet Nam Conflict

41. Have students write, direct, and produce their own play on prohibition and a raid on a "speakeasy." This could be presented to the school or taped for an ETV show if a station is near. Students should make their own props, costumes, etc.

42. Divide class into groups and have each group read a biography on one of the leaders of the Temperance Movement. Let each group present information to class. Let class make selection of the most unusual and interesting method of presentation.

43. Invite pharmacist to speak to class about dispensing prescriptions and restrictions placed on him.

44. Play "Jeopardy" game with questions taken from the Temperance Movement and the Prohibition Period.

45. Invite a doctor or pharmacist to discuss the effects of mixing drugs, overdose symptoms, and withdrawal symptoms.

46. Discuss tolerance and physical dependence. Experiment with the effect of water and alcohol on growth and constitution of live plants or food substances (potato, bread, liver, sugar, egg white).

47. Have students design a program to inform parents and community about drug use and abuse.

48. Do research on how much money a hard-core addict needs to support his habit.

49. Interview a businessman to find out how he deals with problems of drug abuse in industry.

50. Debate: Resolved, that the penalty for using drugs illegally should be greater because the expense of securing law enforcement officers and the expense of keeping offenders in jail place a tremendous financial burden on the taxpayer.

51. Conduct a survey of local industries as to what percentage of workers are absent from work due to an excessive use of alcohol. How many are absent due to accidents on the job? (Cite individual interviews with employers.) Using graphs and charts, present to class for evaluation of data.

52. Discuss whether teachers should counsel students who are known drug abusers or refer them to guidance counselor, principal, parents, or local law enforcement agency.

53. On a large state map, pinpoint areas where most drug-related arrests occur. Discuss the possible reasons for the apparent large number of violations in these areas.

54. Write foreign embassies, requesting information about drug laws regarding the sale and possession of illegal drugs and do the following:

    a. Report the findings to class for discussion and comparison.
    b. Illustrate comparisons with charts, graphs, tables, exhibits, posters, cartoons, and pupil-made transparencies.

55. Write letters to congressmen to find out what, if any, changes in drug laws are being proposed in the present session of Congress.

56. Examine and discuss activities undertaken by agencies of the United States Government to suppress illegal traffic in narcotics.

57. Cite the major international sources of narcotic drugs which reach this country illegally.

58. List international organizations which exist for the control of narcotic drugs and discuss briefly the activities of each organization.

59. Discuss professions that are closed to the convicted felon.

60. Participate in a group discussion, answering the following question: "What changes would you make in the present laws or what new laws would you make to control more effectively the misuse of drugs and other substances? Why?"

61. Invite to your class a panel composed of a lawyer, law enforcement officer, and pharmacist to discuss local drug laws and any restrictions that might affect each of them in their work.

62. Find a news article pertaining to a drug-related court case and ask students to react to judgment rendered.

63. Analyze and discuss drug-related music and poetry in relation to the following questions:

    a. What type of drugs are discussed?
    b. Is the song or poem "pro" or "anti" drugs?
    c. What is the reasoning behind the song or poem?

64. Install a question box in which students might submit problems for discussion which may deal with drug-related problems.

65. Visit a court session to observe a trial on a drug violation.

66. Keep scrapbook of news articles on drugs. Tabulate the number of writings that pertain to laws, raids, court cases, etc.

67. Draw an editorial cartoon or make a poster on one drug control law.

APPENDIX A

FILMS

The following free films are available by writing to the State Department of Education, Social Studies, Civil Defense, 111 Coliseum Boulevard, Montgomery, Alabama 36109, or calling 832-5855.

A LADY CALLED CAMILLE, 28:50 minutes, color

"Camille," the most devastating hurricane ever to hit this country, came calling on a hot August weekend in 1969. Wherever she went, she left a trail of death and destruction. Along the Gulf Coast, her tidal waves and 200-mile winds flooded the entire Louisiana Delta and flattened town after town on the Mississippi shore. Then, two nights later, she dropped twenty-seven inches of rain on the Blue Ridge Mountains of Virginia in less than six hours, starting flash floods and landslides that buried whole communities in their sleep.

IN TIME OF EMERGENCY, 25:30 minutes, color

This is the motion picture version of the authoritative new citizen's handbook on Nuclear Attack, "In Time of Emergency," available from civil defense offices, issued by the Defense Civil Preparedness Agency. This film tells not only what the government is doing now to protect our people but what the people should do to protect themselves against possible emergencies.

THE FACE OF DISASTER, 10 minutes, black and white

The United States suffers some 300 disasters a year--fire, flood, tornado, hurricane, even earthquakes. This short film highlights some of our recent major natural disasters--the great Alaskan Quake of 1964, the floods of 1965, the devastation wrought on Palm Sunday when 37 tornadoes boiled through the Middle West. It emphasizes the role of community welfare services in helping to meet these emergencies, and will be particularly useful in the study of natural disasters.

TORNADO, 15 minutes, color

This film tells the story of a typical Midwestern town that lies in the path of a destructive tornado. It includes scenes of a tornado in action and describes protective preparations. It shows weather conditions which may generate a tornado.

The following additional films are available from the above source on a limited basis. Only a few prints are in our film library.

About Fallout, 24 minutes, color
Earthquake, 14 minutes
Our Active Earth, 28:30 minutes, color
Though the Earth Be Moved (The Alaskan Earthquake), 45:28 minutes, black and white

The following films are available by writing to the Alabama Department of Public Health, Bureau of Primary Prevention, Room 204, State Office Building, Montgomery, Alabama 36130, or by calling 832-3194.

WATER

S-1 A STREAM ENVIRONMENT, color, P-el, 9 minutes

To help children discover the many interrelated life forms that live in a stream environment, the camera explores a stream that begins high in the mountains and, as it grows, provides food and shelter for creatures in the stream and along the banks.

S-5 SAFE WATER: THE HIGH COST OF DRINKING, color, Jh-Sh, 15 minutes

S-7 HEALTH AND THE CYCLE OF WATER (1941), Jh-Sh-A, 25 min.

Traces an outbreak of typhoid fever from its source, a polluted stream, to an average American town. The complete cycle of water is described--purification process and sewage treatment processes.

S-23 BETTER WATER FOR AMERICA, color, Jh-Sh-A, 15 minutes

This film illustrates the importance of water in our lives and the many jobs that it performs for us. The history of man's struggle to transport and store water to centers of civilization is briefly related. The importance of modern water utility companies in making water available to each of us is emphasized. Present efficient and economical efforts of such public utilities are touched on as well as research and plans for future use of water.

S-31 THE RIVER MUST LIVE, color, AG, 21 minutes

A frightening study of what happens when a river is overloaded with more waste than it can absorb, and the consequences to those who have to depend on it. The film explores methods which can overcome pollution so that a river is made healthy again.

RADIOLOGICAL HEALTH

Ra-1 RADIATION: PHYSICIAN AND PATIENT (1958), color, Pr, 45 minutes

An informal talk by a prominent physician about medical radiology--the problems it raises, its biological effects, its physical behavior, and its proper use in clinical examinations.

Ra-3 ABOUT FALLOUT, (1963), color, Jh-Sh-A, 28 minutes

This film discusses the physics, effects, and defense against nuclear fallout and reviews the phenomena of natural background radiation. Dissemination and dangers of fallout resulting from nuclear detonation are described. The film explains the value of time, distance, and mass in weakening the effects of residual radiation. Effects of radiation on the body, food, and water are examined, and the importance of adequate shelter and prescribed decontamination measures is emphasized.

WASTE DISPOSAL

S-3 THE RUN-AROUND (1969), color, AG, 17:30 minutes

After seeing his house blackened, his plants destroyed, and his health threatened, the hero of this animated film decides something must be done about air pollution. While urging citizen awareness and participation in the problem, the film captures the frustration and futility often resulting from attempts to clean up the air.

S-6 OUR LAND NEEDS YOUR HELP, color, Jh-Sh, 13 minutes

S-24 REFUSE DISPOSAL BY SANITARY LANDFILLS (1956), color, A-Pr, 13 minutes

Describes the faults of disposal methods such as open dumps; compares the vector-borne disease and nuisance hazards of these methods to those of landfills. Shows how to select a site, types of equipment used, how to construct a landfill, different types of operating procedures, and overall contributions of sanitary landfills to public health.

S-25 THE THIRD POLLUTION (1966), color, Jh-Sh-A, 23 min.

This film describes America's three billion dollars a year solid waste problem and demonstrates new techniques of solid waste management.

S-26 A LAND BETRAYED, color, AG, 10 minutes

This film on the ugliness that is growing in America shows what some organizations and local and federal governments are doing to stop this condition, but most of all it stresses the individual's role in this much-needed crusade.

S-30 OUT OF SIGHT - OUT OF MIND (1970), color, A-Pr, 10 minutes

The use of the sanitary landfill method of refuse disposal as opposed to the open dump is stressed in this film. Emphasis is on the operational methods of sanitary landfill. The film shows the different types of equipment for use with the landfill method.

NOISE POLLUTION

S-2 POPULATION AND POLLUTION (1971), color, El-Jh-Sh, 17 minutes

Showing how pollution increases as population increases, this film shows how each person can help with the problem by using lead-free gasoline, using soaps rather than detergents, bringing bottles and cans to recycling centers, and refusing to buy harmful garden insecticides. Of particular appeal to youth are scenes showing youngsters fishing trash out of waters, and planting new trees and shrubs.

S-4 NOISE AND ITS EFFECTS ON HEALTH, color, Jh-Sh, 20 minutes

MEDICAL SELF-HELP

MSH-1 RADIOACTIVE FALLOUT AND SHELTER (1964), color, Sh-A, 28 minutes

This film deals with problems such as blast and radiation, emphasizing protection against radioactive fallout. It outlines simple protective procedures that can be carried out at home and in community shelters.

MSH-2 HEALTHFUL LIVING IN EMERGENCIES (1964), color, Sh-A, 28 minutes

The film shows how to prevent the spread of disease when people live under insanitary and crowded conditions and the public water system and sewerage are nonexistent. Particularly directed toward predisaster planning and post-disaster improvisation.

MSH-3 ARTIFICIAL RESPIRATION (1964), color, Sh-A, 14 minutes

The techniques of mouth-to-mouth resuscitation are taught. Alternate use of the back pressure arm-lift method for specific situations is also covered.

MSH-4 BLEEDING AND BANDAGING (1964), color, Sh-A, 28 minutes

Methods of stopping bleeding and applying bandages for different kinds of wounds are taught.

MSH-5 FRACTURES AND SPLINTING (1964), color, Sh-A, 28 minutes

The film shows how to recognize fractures, dislocations, and sprains and treat them with improvised splints.

MSH-6 TRANSPORTATION OF THE INJURED (1964), color, Sh-A, 14 minutes

The film stresses improvised methods of moving sick and injured persons and gives precautionary measures for prevention of further injuries.

MSH-7 BURNS (1964), color, Sh-A, 14 minutes

Provides information on the care and treatment of burns, with emphasis on prevention of infection. The film stresses understanding of different kinds of burns, how they may occur, and how they may be prevented.

MSH-8 SHOCK (1964), color, Sh-A, 14 minutes

Shows how to recognize and treat shock. The seriousness of shock and methods of prevention are stressed.

MSH-9 NURSING CARE OF THE SICK AND INJURED (1964), color, Sh-A, 28 minutes

Information is provided on the general care of patients and long-term care of injuries after emergency treatment has been administered.

MSH-10 INFANT AND CHILD CARE (1964), color, Sh-A, 14 min.

Improvised but effective methods for infant and child care in a disaster situation are shown.

MSH-11 EMERGENCY CHILDBIRTH (1964), color, Sh-A, 28 min.

The fundamental techniques to be followed in assisting a normal delivery are covered.

Drug Education films may be obtained by contacting your school librarian or writing State Department of Education, Drug Education Resource Center, University Station, Birmingham, Alabama 35294.

FOR YOUR OWN USE

Please feel free to use the following space to list names and sources of other films.

ENVIRONMENTAL FILMS
AVAILABLE ON FREE LOAN

All films are 16MM sound and color unless otherwise specified. Request from:

National Audiovisual Center
Distribution Branch
Washington, D. C. 20409

Please allow at least 3 to 4 weeks for delivery.

Environmental Protection Agency

(Revised April 1973)

Pandora's Easy Open Pop Top Box

1967. 15 min. Cleared for TV. The engulfing of rural areas by the clatter and clutter of urbanization, using the sounds of the countryside and the city for most of the commentary.

Beware the Wind

1967. 22 min. We observe the creation of the planet, and already the threat of air pollution is made apparent. The origins and evolution of the worldwide affliction of dirty air are artfully shown not only in American cities but in various European capitals as well. The film shows the principal sources of air pollution, including industrial operations, burning dumps, motor vehicles, and combustion of fossil fuels like coal and oil. It describes with some intended irony the effects of air pollutants on animals, people, and property. Some of the most striking shots of large cities under visible pollution appear in the film. Attention is given to the means of applying the available technology to bring about cleaner air through the efforts of a concerned citizenry. Narrated by Mr. Robert Preston. Produced by Airlie Foundation, Warrenton, Virginia.

The Run-Around

1969. 11 min. With satirical animation, the film traces the adventures of Mr. Hack, our average man who is determined to track down the sources of air pollution. His search leads him from one pollution source to another, each admitting partial fault, each claiming vast attempts at clearing the air, and each passing the buck on to the next party. At the conclusion of the trip Mr. Hack proves that he, too, is part of the vast Run-Around in placing his own personal interests before the need to participate in the fight against air pollution. Produced by the National TB & RD Association.

Sweetening the Air

1971. 22 min. If technology continues to develop in the future without taking into account its effects on the environment, we may reach the point, in some instances, of having to evacuate a city which is under a serious episode of air pollution. The answer lies not only in rebuilding our major technological enterprises but also in changing our life style. Much of what we use once and throw away ends up being burned as garbage. Our growing demands for electricity also contribute to the air pollution problem. Environmental specialists Dr. Barry Commoner and Professor Ronald Mills show some of the new techniques for treating the problem, including a system for removing fly ash from smokestacks, closed circuit power-generating plants, dust control procedures, and an energy cell which could replace the gasoline engine.

The Great Clean Air Car Race

1970. 25 min. In August of 1970 more than forty unusual automobiles participated in a cross-country race from Boston to Pasadena, California, taking seven days. These were experimental cars--electric, steam, turbine, modified internal combustion, and various hybrids--designed and operated by students from thirty-two universities and high schools. Among the fuels used were propane, natural gas, and alcohol. Not in a race, in the usual sense, these cars were judged on low pollution emissions, noise, and other factors, as well as speed. Sponsored by MIT and Cal Tech, the event stimulated young people at colleges to help apply some practical contributions to the automotive air pollution problem. Narrated by Orson Welles.

The Race for Clean Air

1970. 27 min. This film is similar to "The Great Clean Air Race." It is recommended that either one or the other be used, depending on the type of audience. "Race for Clean Air," covering the 1970 Clean Air Car Race, is slightly more technical. It includes a brief discussion of the different control systems, different fuels, and different propulsion systems that were entered in the cross-country event. Narrated by Alexander Scourby.

What's New in Solid Waste Management

1970. 37 min. Shows a variety of new and improved solid waste management techniques, featuring specially developed equipment in actual operation. These projects are part of the demonstrations and investigations conducted under provisions of the Solid Waste Disposal Act. The film is designed for technical audiences and is particularly intended to assist public works directors and elected officials who must evaluate alternative systems and equipment, including costs, capacities, and other data.

Sanitary Landfill: One Part Earth to Four Parts Refuse

1969. 24 min. Presents all aspects of landfill planning and operation from site selection, equipment requirements, climate influences, operating procedures, topography, and soil conditions to final contour planning and ultimate use of the completed fill. While much of the film concerns deep filling--landfills of 200 tons per day capacity or greater--much of the information given can, with judgment, be applied to similar facilities. Designed for technical audiences.

Recycling

1971. 21 min. Shows a variety of efforts to recover and reuse more of our discards. This approach has the dual benefit of conserving our resources while minimizing the expense and difficulty of solid waste disposal. Illustrates new techniques that are being investigated and demonstrated under provisions of the Solid Waste Disposal Act. Ideal for classroom use and for showing to community action groups and local officials to explain the emerging new field of reuse, recovery, and recycling.

The Green Box

1970. 17 min. Cleared for TV. Illustrates a novel rural solid waste collection and disposal system which was developed by Chilton County, Alabama, to serve its 26,000 predominantly rural residents scattered over a 700-square-mile area. Four-cubic-yard containers located throughout the county are emptied every other day by a specially equipped packer truck. The county's old rat-infested dumps were closed and roadside maintenance problems have been solved. The film is designed to interest the lay public and assist local officials to devise workable rural solid waste management systems.

A Question of Values

1972. 28 min. 16mm. "A Question of Values" is a film which illuminates an intense public debate in a small Maine town--torn by conflict between environmental preservation and economic development. The issue facing the townspeople is clear-cut. A New York oil company wants to build a modern oil refinery in Maine and crude oil would be provided by giant 200,000-ton tankers which would move through rocky approaches to Penobscot Bay, known for its fog, tricky tidal currents, and natural beauty. Huge oil spills could wipe out lobstering, fishing, and the tourist-based economy of the area. But there is high unemployment in the area, and the refinery would bring jobs and attract satellite industries. New money would bolster the local economy. The Maine people involved have taken sides because they know their future could be at stake. Feelings run high. The film introduces nine persons on all sides of the debate and provides an insight into their lives which shows why they believe as they do.

The Gifts

1969. 28 min. "The Gifts" is a documentary film about the American landscape and what has happened to it during the course of the past two and a half centuries. The film's title comes from the Nation's legacy of clean water, pure air, and virgin land, a legacy that because of the rising rate of pollution, is under the gravest threat in history. Please request from: Modern Talking Picture Service, 2000 "L" St., N.W., Washington, D. C. 20036.

A Man and a River

1971. 14 min. This film is about a river and a man in love with it. The man is Thomas Hart Benton, great citizen of America, painter, author, conservationist, and raconteur. The river is the Buffalo, a clear-running waterway that winds through the Ozark hills of northwestern Arkansas. Happiness to Benton is to be on a stream or near a stream, and this film tells the story of his love affair with the Buffalo River. With a companion, Benton sets out in a canoe in a slowly moving current of the river. The men negotiate peaceful pools and swift water of the free-flowing river now protected by federal law against defilement of its natural treasures. Benton has a message for all Americans as he speaks of the Buffalo: "The beauty and charm of this river, it's a kind of wild nature quality. My idea is to keep that, or what remains of it, if we can . . . for our children and grandchildren." "A man and a River" is a fervent call to preserve beauty by a man who perceives beauty.

Air is for Breathing

1971. 29 min. A study of air pollution in the United States. The film seeks primarily to broaden our understanding and give a reasoned analysis of what the main pollutants are and the principals that must guide a systematic and effective approach to pollution control. It also illustrates the research that is improving our technical capability and some of the control measures that are being implemented. The message is clear that polluted air is everyone's business. It is a complex and costly business that will not be solved overnight. It will require the patience, energy, and cooperative effort of every American.

In the Bag

1969. 19 min. Presents the paper sack system of refuse storage and collection as an efficient and economical new approach. Describes advantages to the householder, the collector, and the landfill or incinerator operator. Depicts the application of the paper refuse sack in a variety of situations, showing residential, recreational, industrial, commercial, and institutional uses.

The Third Pollution

1966. 23 min. Dramatizes the nation's $4.5-billion-a-year problem of managing its solid wastes. Burning refuse contributes to air pollution, and dumping it contaminates groundwater supplies. In addition, the collection and disposal of solid wastes are expensive and technically challenging. This film describes the various alternatives which are available.

The Stuff We Throw Away

1970. 22 min. Describes the massive problem of collecting and disposing of America's solid wastes. Illustrates a variety of new and improved techniques that are being investigated and demonstrated under provisions of the Solid Waste Disposal Act.

The Realities of Recycling

1971. 38 min. Shows a variety of equipment being used to recover and reuse materials from solid wastes. Existing markets for glass, aluminum, and steel containers, paper, and old car hulks are described, along with new technology being investigated and demonstrated under provisions of the Solid Waste Disposal Act.

The following two films were added to those available on loan in August 1973.

The First Pollution

16mm, color, 26 min. This film deals with water pollution problems: what they are, who produces them, what's being done about it, and what will happen in the future. The film shows the Potomac, the Kanawha, the Tittabawassee, the Houston Ship Channel and other streams. The viewer sees the combined sewers of St. Paul, the advanced waste treatment plant at Lake Tahoe, the Dow Chemical recycling plant, and the Armco Steel industrial waste recovery system. Concepts such as the "living filler," oxygen aeration, and sewage reclamation are shown. The first pollution man noticed was water pollution. We are not learning how to clean it up. This substantive film about municipal and industrial water quality management will interest the viewer in water pollution problems by exposing him to many current solutions throughout the country.

The Second Pollution

16mm, color, 22 min. The pollution that affects us most personally is the pollution of the air we must breathe. Los Angeles provides a case history of a city that has worked for decades to reduce its air pollution from both stationary and mobile sources and yet still has a problem. Chicago is using laws and strict enforcement to control sulphur oxide emissions produced in the burning of fossil fuels. Automobiles spit out hydrocarbons, carbon monoxide, and nitrogen oxides; and current efforts are primarily focused on catalytic conversion to more acceptable materials and redesign of the internal combustion engine. While the second pollution became apparent later than water pollution, air pollution problems are of paramount importance to a clean environment.

FILMS AVAILABLE ON FREE-LOAN BASIS

To Conserve and Protect (color, 14½ min. #3866)

Covers the various aspects of noise pollution - its causes, bad effects on humans, and conservation measures. Available from Modern Talking Picture Service, Inc., 412 W. Peachtree St., N.W., Atlanta, Georgia 30308.

Oil! Spoil! Patterns In Pollution (color, 17 minutes)

Discusses our energy problems with striking impact. Available from Association-Sterling Films, 866 Third Avenue, New York, New York 10022. Order S-577.

Endless Chain (color, 28 minutes)

The Atomic Energy Commission's Arid Lands Ecology Program is discussed. Spectacular nature scenes are used to demonstrate the balance of nature. The film explains the dependence of plant and animal organisms on one another and illustrates man's destructive effect on the environment. Film features stop-action sequences for extra effectivity. Available from U. S. Atomic Energy Commission, Film Library - TIC, P. O. Box 62, Oak Ridge, Tennessee 37830.

APPENDIX B

FREE RESOURCE MATERIAL

Teachers may obtain the following free materials by writing to the State Department of Education, Social Studies, Civil Defense, 111 Coliseum Boulevard, Montgomery, Alabama 36109, or calling 832-5855. Due to the limited quantity available, one packet of material will be provided for each teacher teaching The Challenge of Survival. Availability of these publications is determined by the supply from the various sources.

1. Natural Disaster Packet:

Title	Pamphlet Number
"Lightning" pamphlet	NOAA 70005
"Tornado" pamphlet	NOAA 70007
Tips for Tornado Safety (Wallet card)	NOAA 70016
"Winter Storms" pamphlet	NOAA 70018
Rules for Riding out Winter	NOAA 70019
Hurricane Information and Atlantic Tracking Chart	NOAA 70023
Survival in a Hurricane (Wallet card)	NOAA 70027
Earthquake Safety Rules (Poster)	NOAA 71014
When an Earthquake Strikes (Wallet card)	NOAA 71051
Flash Flood - The Treacherous Torrent (Poster)	NOAA 72020

2. Environmental Packet:

Closing the Circle
The Noise Control Act of 1972
Working Together For a Livable Land
Plants, How They Improve Our Environment
The Earth, Our Home in Space
The Story of Land
Food and the Land
Alabama Law
The Sunburst
The Federal Environmental Pesticide Control Act of 1972
Action for Environmental Quality
Your World, My World
Research and Monitoring
Don't Leave It All to the Experts
Environment, Problems, Solutions, and Emergency Preparedness
Toward a New Environmental Ethic
The Challenge of the Environment
Waste Not, Want Not
I Can Save the Earth
In Productive Harmony
Bugs, Blights, Blazes
Activity Sheets
Cleanest Shirts in Town
Help Keep Our Land Beautiful

The Fight to Save America's Waters
Needed: Clean Water
A Primer on Waste Water Treatment
The Processing and Recovery of Jon Thomas-Cool Cat!
Environmental Protection Agency
Your Fabulous Friend
How Paper Comes From Trees
Environmental Education in Alabama
Alabama Environmental Quality Films
Environmental Films Available on Free Loan

3. Nuclear Packet

Introduction to Civil Preparedness
Personal and Family Survival
Nuclear Weapons Effects Programmed Instruction
Family Shelter Designs
Home Fallout Shelter
Civil Defense and Clean Air
Civil Preparedness and Your Community
Fallout and Your Farm Food
Civil Defense Suggests This Emergency Food Supply for Each Person For Two Weeks
Family Food Stockpile For Survival
Defense Against Radioactive Fallout on the Farm
Rural Fire Defense
Abbreviations and Definitions of Terms Used in Civil Defense Training
Government in Emergency
In Time of Emergency-a Citizen's Handbook

APPENDIX C

This is a suggested guide for the science program to provide a basic technical foundation for implementing the civil defense course of study in the eighth grade social studies curriculum.

RELEVANT SCIENTIFIC INFORMATION

I. Matter And Its Changes

    A. Composition of matter

        1. State of matter
        2. Common properties of matter
        3. Structure of matter

            a. Matter composed of molecules
            b. Molecules composed of atoms
            c. Structure of atoms-protons, electrons, neutrons
            d. Energy levels
            e. Introduction to periodic chart

    B. Changes in matter

        1. Physical
        2. Chemical

    C. Elements
    D. Compounds
    E. Mixtures
    F. Acids, bases, and salts

II. Energy

    A. Radiant (light, heat, sound, cosmic rays, X-rays)
    B. Mechanical
    C. Electrical
    D. Chemical
    E. Nuclear Energy (energy in atoms)

        1. Structure of atom

            a. Particles
            b. Charges
            c. Weight and atomic number of familiar elements
            d. Isotopes

2. Energy
   - a. Atomic (fission, fusion)
   - b. Chain reaction
   - c. Gives off radioactive rays (alpha, beta, gamma)
   - d. Power plants (Atomic Energy Commission)

3. Transportation of radioactive materials (trucks, trains, etc.)

III. Readiness Against Severe Local Storms and Other Natural Phenomena - thunderstorms, floods, tornadoes, hurricanes, earthquakes.

A. Causes
B. Unique characteristics

1. Associated weather phenomena (wind, tidal waves, etc.)
2. Life cycle
3. Probable geographic occurrences
4. Intensity
5. Any existing scientific deterrence
6. Forecasting, detecting, and alerting the public
7. Associated hazards (ruptured water pipes, delayed structure collapse, etc.)
8. Individual and precautionary measures

IV. Man-made Disasters and Emergencies

A. Fire

1. Types
2. Methods of extinguishing
3. Nature of associated hazards (suffocation, toxic gases, bodily injury, etc.)
4. Precautionary measures

   a. Prevention

      (1) Home

         (a) Regular check for fire hazards
         (b) Responsible use of flammable liguids, electrical appliances, etc.

      (2) Responsible conduct as it relates to fire prevention

- b. A planned course of action if involved in a fire
    - (1) Awareness of possible safety exits
    - (2) A working knowledge of fire-fighting equipment

B. Nuclear Weapons

1. Comparison of conventional and nuclear weapons (including types and delivery service)
2. Destructive capabilities
3. Energy distribution
    - a. Blasts
    - b. Thermal
    - c. Radiation (initial and residual)
4. Types of bursts
    - a. Air
    - b. Surface
    - c. Subsurface
5. Blasts effects
    - a. Pressure waves
    - b. Effects of blast on structure, people, etc.
6. Nuclear radiation
    - a. Types of radiation - alpha, beta, gamma
    - b. Measuring radiation (instruments)
    - c. Exposure and effects on living tissue
7. Protection from nuclear hazards
    - a. Blasts
    - b. Thermal
8. Radiation
    - a. Time
    - b. Distance
    - c. Shielding

APPENDIX D

This is a suggested guide for the physical education program to provide a basic knowledge of medical self-help which is essential for implementing the civil defense course of study in the eighth grade social studies curriculum. The following information is a brief summary of the pertinent areas of emphasis as contained in Public Health Service Publication No. 1042 (Medical Self-Help Training Booklet).

RELEVANT PHYSICAL EDUCATION INFORMATION

I. Radioactive Fallout and Shelter: This material emphasizes protection against radiation and discusses some of the effects that radiation has on people.

II. Healthful Living in Emergencies: This material includes ways to maintain hygienic and sanitary living in emergencies without the usual unlimited water and sewage facilities.

III. Artificial Respiration: This section teaches the various techniques of artificial respiration as well as phases of recuperation in the limited confines of any shelter.

IV. Bleeding and Bandaging: Methods to stop bleeding and to apply dressings are taught emphasizing the improvisation necessary to shelter living.

V. Fractures and Splinting: Special attention is given to follow-up care since professional help may not be available.

VI. Transportation of the Injured: Stress is placed upon the use of articles likely to be in shelters with which to improvise means of moving injured persons. Precautions are given for preventing further injuries.

VII. Burns: The care and treatment of burns and the prevention of infection is to be taught.

VIII. Shock: Emphasis is placed on the recognition of symptoms and the provision of adequate treatment of shock.

IX. Nursing Care of the Sick and Injured: This material includes general care of illnesses and injuries.

X. Infant and Child Care: Effective methods for the care of infants and children within the confines of shelter living are covered.

APPENDIX E

RESOURCE AGENCIES

State

State Department of Agriculture and Industries
P. O. Box 3336
Montgomery, Alabama 36109

Alcoholic Beverage Control Board
P. O. Box 1151
Montgomery, Alabama 36130

State Department of Civil Defense
State Administrative Building
64 North Union Street
Montgomery, Alabama 36130

State Department of Conservation and Natural Resources
Administrative Building
64 North Union Street
Montgomery, Alabama 36130

Alabama Forestry Commission
513 Madison Avenue
Montgomery, Alabama 36130

Alabama Department of Public Health
State Office Building
Montgomery, Alabama 36130

Bureau of Publicity and Information
Room 403
State Highway Building
Montgomery, Alabama 36130

Alabama State Department of Education
Social Studies-Civil Defense
111 Coliseum Boulevard
Montgomery, Alabama 36109
or
Ayers Hall
Jacksonville State University
Jacksonville, Alabama 36265

State Department of Education
Drug Education
111 Coliseum Boulevard
Montgomery, Alabama 36109

Alabama Air Pollution Control Commission
645 South McDonough Street
Montgomery, Alabama 36130

Alabama Water Improvement Commission
Room 749
State Office Building
Montgomery, Alabama 36130

Federal

Technical Information Officer
U. S. Environmental Protection Agency
Eastern Environmental Radiation Laboratory
1890 Federal Drive
P. O. Box 3009
Montgomery, Alabama 36109

National Weather Service Forecast Office
11 West Oxmoor Road
Birmingham, Alabama 35209

National Weather Service Office
P. O. Box 6008
Huntsville, Alabama 35806

National Weather Service Office
P. O. Box 8903
Mobile, Alabama 36608

National Weather Service Office
Dannelly Field
Route 8, Box 600
Montgomery, Alabama 36108

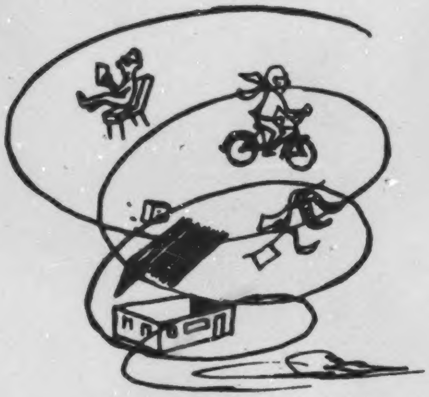
APPENDIX F

TRANSPARENCY MASTERS

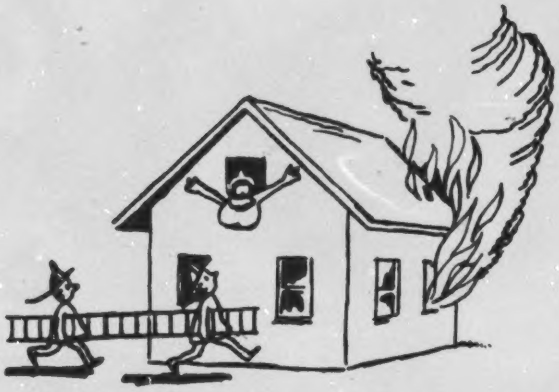
A WORD TO TEACHERS:

THESE TRANSPARENCY MASTERS WERE DESIGNED TO MEET MINIMUM NEEDS. IT IS SUGGESTED AND RECOMMENDED THAT ADDITIONAL TRANSPARENCIES BE DEVELOPED IN ORDER TO MORE READILY MEET LOCAL NEEDS.

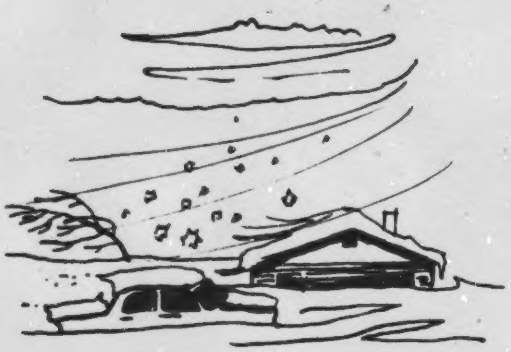
DISASTERS



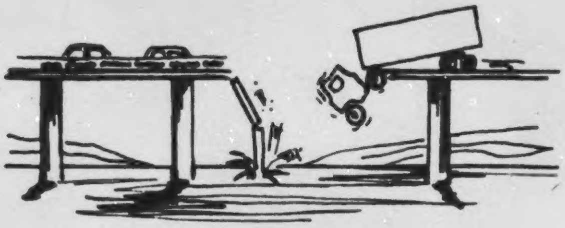
WINDSTORM



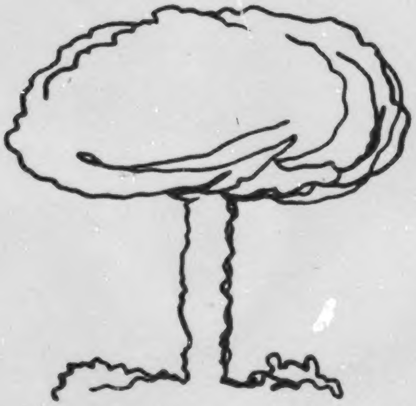
FIRE



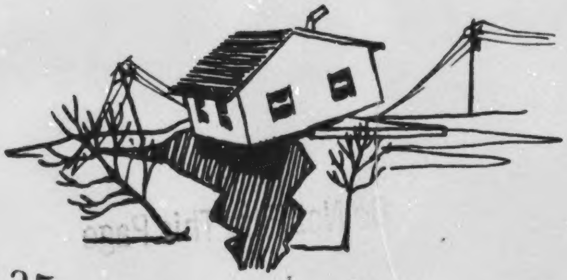
SNOWSTORM



BRIDGE COLLAPSING

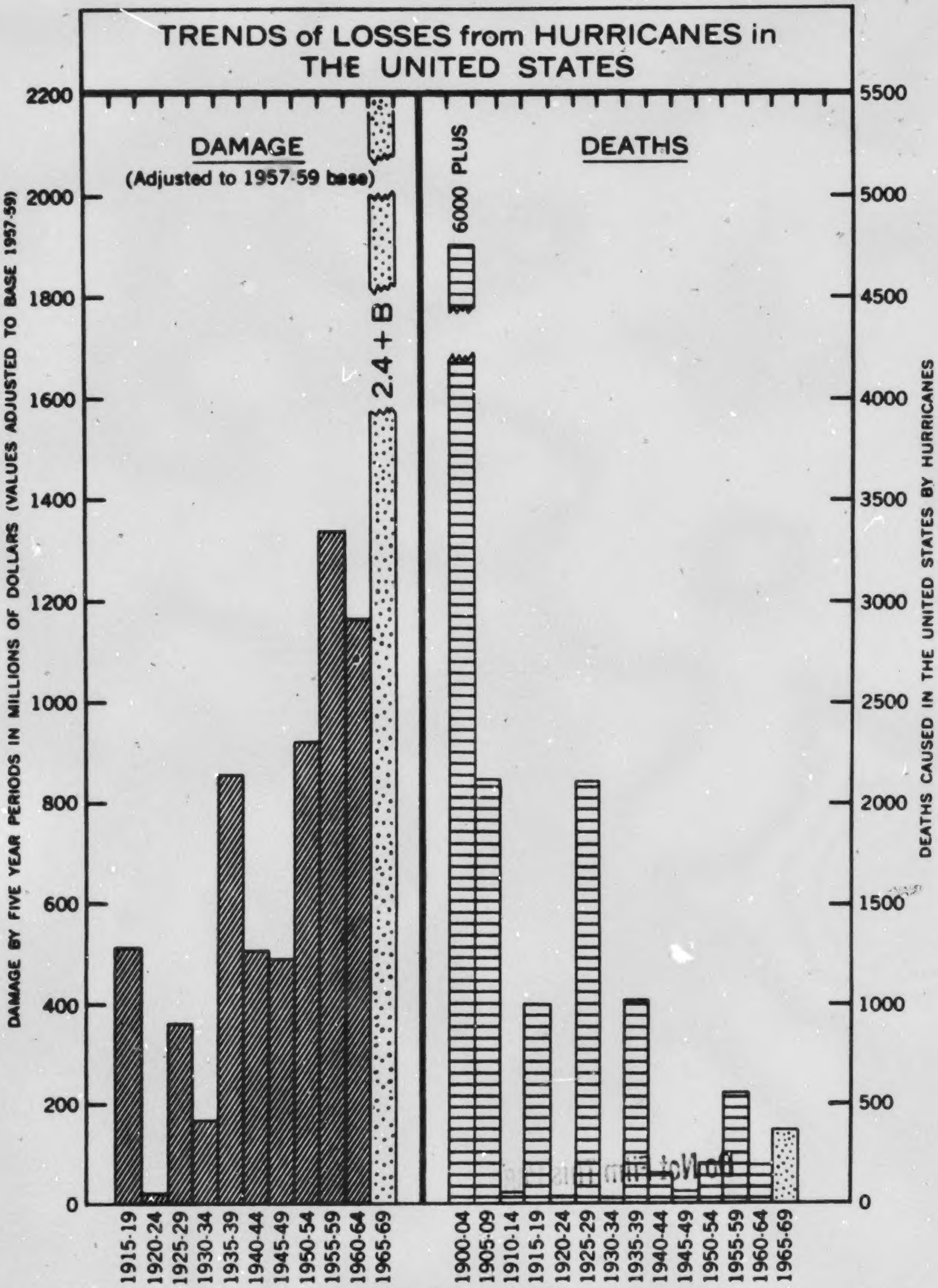


NUCLEAR ATTACK



EARTHQUAKE

SOURCE: GOVERNMENT IN EMERGENCY, CIVIL DEFENSE PUBLICATION, MP 56
Visual 1



Hurricane Damage and Deaths—from *Project Stormfury—1970*, U.S. Department of Commerce, 1970.

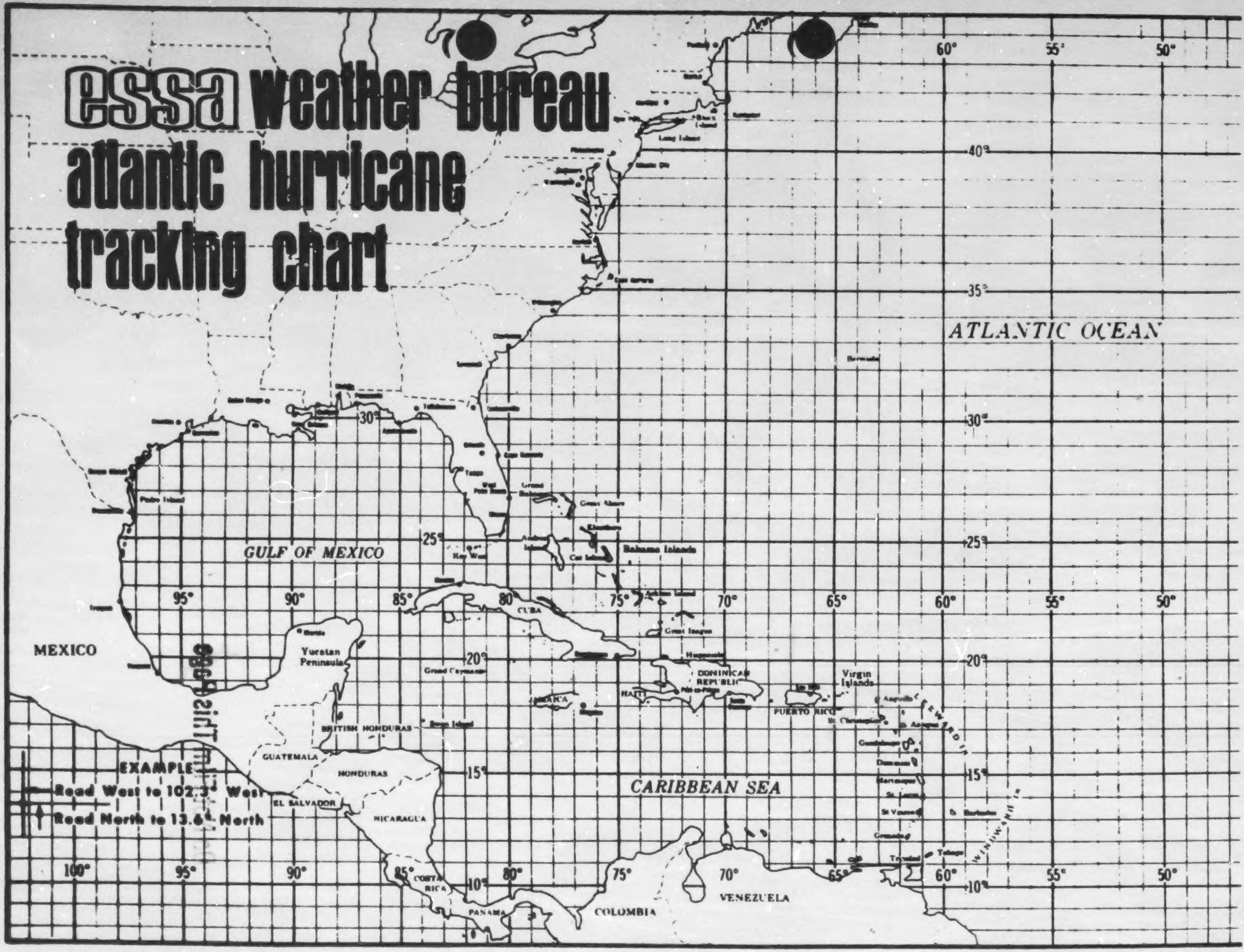
Visual 2

Estimated loss of life and damage in the United States from North Atlantic Tropical Cyclones, 1915-1970 (damage estimates as of year of occurrence) - casualty figures from Climatological Data, National Summary, 1971 (p. 68), U. S. Department of Commerce, NOAA; damage estimates updated from Nationwide Natural Disaster Warning System (p. 27), U. S. Department of Commerce, 1965.

Year	Lives Lost	Damage in Million $
1915	600	63.0
1919	287	22.0
1926	269	106.5
1928	1,836	25.0
1935	414	11.5
1938	600	300.2
1954	193	755.5
1955	218	984.5
1957	395	152.1
1969	256	1,420.0

Note: Selected casualty and damage loss statistics taken from U. S. Department of Commerce, National Oceanic and Atmospheric Administration data.

Visual 3


essa weather bureau
atlantic hurricane
tracking chart
ATLANTIC OCEAN
GULF OF MEXICO
CARIBBEAN SEA
MEXICO
Yucatan Peninsula
CUBA
Bahama Islands
Grand Cayman
Key West
Bermuda
Long Island
JAMAICA
HAITI
DOMINICAN REPUBLIC
PUERTO RICO
Virgin Islands
BRITISH HONDURAS
GUATEMALA
HONDURAS
EL SALVADOR
NICARAGUA
COSTA RICA
PANAMA
COLOMBIA
VENEZUELA
EXAMPLE
Read West to 102.3° West
Read North to 13.6° North
100°
95°
90°
85°
80°
75°
70°
65°
60°
55°
50°
40°
35°
30°
25°
20°
15°
10°

Visual 4

How to Track a Hurricane

Advisories are numbered consecutively for each storm, and describe the present and forecast position and intensity of the storm. Tropical cyclone advisories are issued at six-hour intervals—at 0000, 0600, 1200, and 1800 hours,* Eastern Daylight Time. Bulletins provide additional information. Each message gives the name, eye position, intensity, and forecast movement of the tropical cyclone.

Hurricane eye positions are given by latitude (for example, 13.2 degrees North) and longitude (for example, 57.8 degrees West), to the nearest one-tenth of one degree. When the storm moves within range of the radar fence eye position may also be given as statute miles and compass direction from a specified point—for example, 100 miles east of Miami.

When you receive a tropical cyclone advisory, note the advisory number, eye position, intensity, and forecast direction of movement in the table at right. Then mark the eye position on the tracking chart. Because hurricanes change direction very quickly, you should concentrate more on where the storm will go than where it has been.

Storm Name	Advisory Number	Position						Maximum Wind (mph)	Central Pressure (inches Hg)	Forward Speed (mph)	Direction	Forecast			
												Movement		Intensity	
		Date	Time (EDT)	Latitude (°N)	Longitude (°W)	Miles	from					Forward Speed (mph)	Direction	Increasing	Decreasing

---

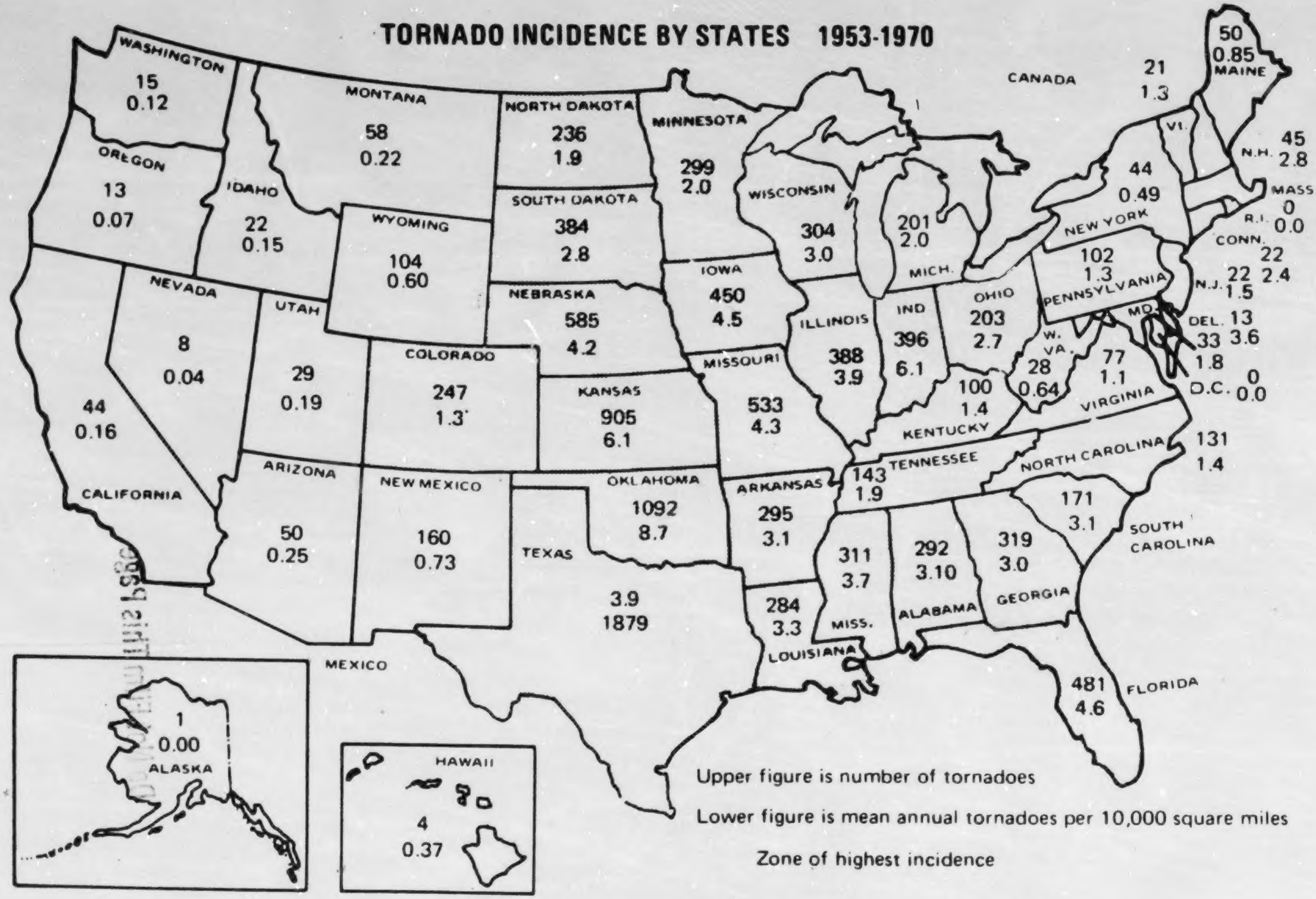
* On the 24-hour clock, 0001 hours is one minute past midnight, 0600 hours is 6:00 a.m., 1200 hours is noon, 1800 hours is 6:00 p.m., 2400 hours is midnight.

EVACUATION

ITEMS TO TAKE WITH YOU

1. FOODS
2. WATER
3. CLOTHING
4. ADEQUATE FINANCES
5. OTHERS

Visual 6


TORNADO INCIDENCE BY STATES 1953-1970
WASHINGTON 15 0.12
MONTANA 58 0.22
NORTH DAKOTA 236 1.9
MINNESOTA 299 2.0
CANADA
21 1.3
50 0.85 MAINE
OREGON 13 0.07
IDAHO 22 0.15
WYOMING 104 0.60
SOUTH DAKOTA 384 2.8
WISCONSIN 304 3.0
MICH. 201 2.0
NEW YORK 44 0.49
VT.
N.H. 45 2.8
MASS. 0 79 5.1
R.I. 0.0
CONN. 22 2.4
N.J. 22 1.5
NEVADA 8 0.04
UTAH 29 0.19
COLORADO 247 1.3
NEBRASKA 585 4.2
IOWA 450 4.5
ILLINOIS 388 3.9
IND 396 6.1
OHIO 203 2.7
PENNSYLVANIA 102 1.3
MD.
DEL. 13 3.6
33 1.8
D.C. 0 0.0
CALIFORNIA 44 0.16
KANSAS 905 6.1
MISSOURI 533 4.3
KENTUCKY 100 1.4
W. VA. 28 0.64
VIRGINIA 77 1.1
ARIZONA 50 0.25
NEW MEXICO 160 0.73
OKLAHOMA 1092 8.7
ARKANSAS 295 3.1
TENNESSEE 143 1.9
NORTH CAROLINA 131 1.4
SOUTH CAROLINA 171 3.1
TEXAS 3.9 1879
MISS. 311 3.7
ALABAMA 292 3.10
GEORGIA 319 3.0
LOUISIANA 284 3.3
FLORIDA 481 4.6
MEXICO
ALASKA 1 0.00
HAWAII 4 0.37
Upper figure is number of tornadoes
Lower figure is mean annual tornadoes per 10,000 square miles
Zone of highest incidence

Tornado Incidence by States (1953-1970)—National Weather Service (updated).

Visual 7

Number of tornadoes, tornado days, and resulting losses by years, 1916-1970--from Climatological Data, National Summary, 1971 (p. 55), NOAA, Environmental Data Service.

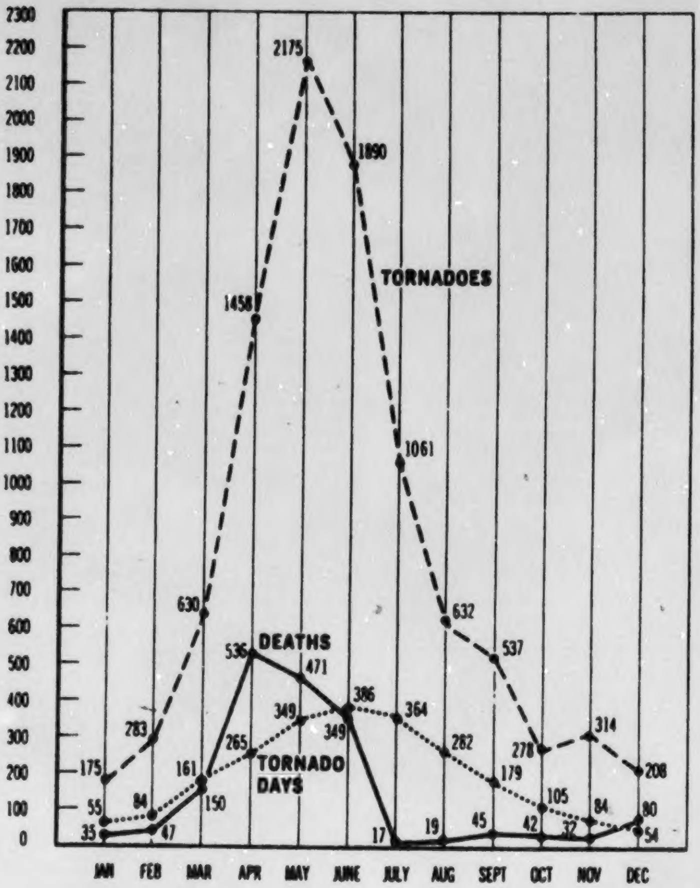
Year	Number Tornadoes	Number Tornado Days	Total Deaths	Most Deaths in a Single Tornado	Total Property Losses*
1917	121	38	509	101	7
1919	64	35	206	59	7
1920	87	50	498	87	7
1921	105	55	202	61	7
1924	130	57	376	85	7
1925	119	65	794	689	7
1927	163	62	540	92	7
1929	197	74	274	40	7
1932	151	67	394	37	7
1933	258	96	362	34	7
1936	141	71	552	216	7
1942	167	66	384	65	7
1944	169	68	275	100	7
1945	121	66	210	69	7
1947	165	78	313	169	7
1949	249	80	212	58	7
1952	236	98	230	57	7
1953	437	136	516	116	8
1965	899	181	298	44	8

Note: The above estimated losses are based on values at time of occurrence.

*Storm damages in categories:

5. $50,000 to $500,000
6. $500,000 to $5,000,000
7. $5,000,000 to $50,000,000
8. $50,000,000 and over.

TORNADO INCIDENCE BY MONTH 1953-1967



SOURCE: TORNADO STATISTICS. U. S. Govt. Printing Office

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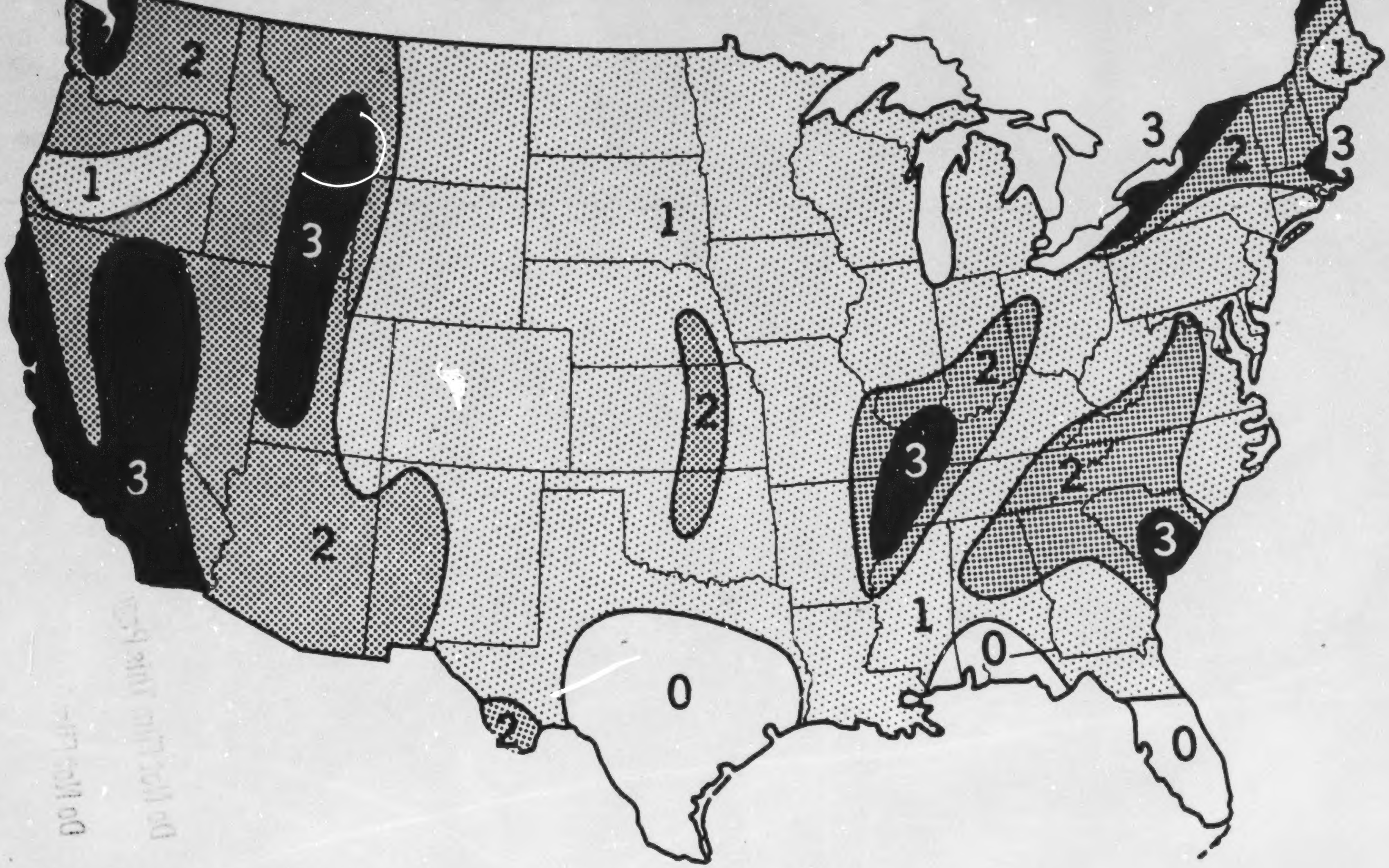
Severe River Flood Disasters in the United States, 1935-1966 (loss of life 25 or more), property damage in millions of dollars--from Climatological Data, National Summary, 1970 (pp. 96-97), NOAA, Environmental Data Service.

Year	Month	Location	Lives	Property
1935	May-July	Republican and Kansas Rivers	110	$ 18.0
	July	Upper Susquehanna	52	26.0
1936	March-April	Eastern United States	107	270.0
1937	Jan.-Feb.	Ohio and Lower Mississippi River Basins	137	417.7
1938	March	Southern California	79	24.5
1939	July	Licking and Kentucky Rivers	78	1.7
1940	August	Eastern Tennessee	40	12.0
1943	April-June	Maumee, Wabash, Upper Missippi, Missouri, White and Arkansas River Basins	60	172.0
1947	May-July	Lower Missouri and Middle Mississippi River Basins	29	235.0
1948	May-June	Columbia Basin	35	101.7
1950	June	Central West Virginia	31	4.0
1951	June-July	Kansas-Missouri	28	923.2
1955	August	Hurricane floods in Northeast	187	714.1
	December	West Coast	61	154.5
1963	March	Ohio River Basin	26	97.6
1964	June	Montana	31	54.3
	December	California and Oregon	40	415.8
1965	June	Sanderson, Texas, flash flood	26	2.7
1969	Jan.-Feb.	California	60	399.2
	July	Northern Ohio	30	87.9
	August	James River Basin in Virginia	154	116.0

Do Not File This Page


3
2
1
3
3
2
1
2
3
2
1
3
3
1
2
3
2
3
2
1
0
0
2
0

Seismic Risk: Zone 0, areas with no reasonable expectancy of earthquake damage; Zone 1, expected minor damage; Zone 2, expected moderate damage; Zone 3, where major destructive earthquake may occur—NOAA map.

Visual 11

POST DISASTER PROBLEMS

1. LOOTING
2. CLEAN-UP
3. DAMAGE ASSESSMENT
4. RELIEF & RECONSTRUCTION
5. RESTORATION OF SERVICES

Visual 12

LOCAL RESCUE
FUNCTIONS

FIGHTING FIRES

CLEARING BLOCKED PASSAGEWAYS

EXTRICATING PEOPLE TRAPPED UNDER RUINS

RENDERING AID TO THE INJURED

CUTTING OFF AND REPAIRING ELECTRICAL, WATER, AND GAS LINES

Visual 13

THE INDIVIDUAL IN AN EMERGENCY

1. Legal rights and responsibilities
2. Moral rights and responsibilities
3. Individual's sense of values

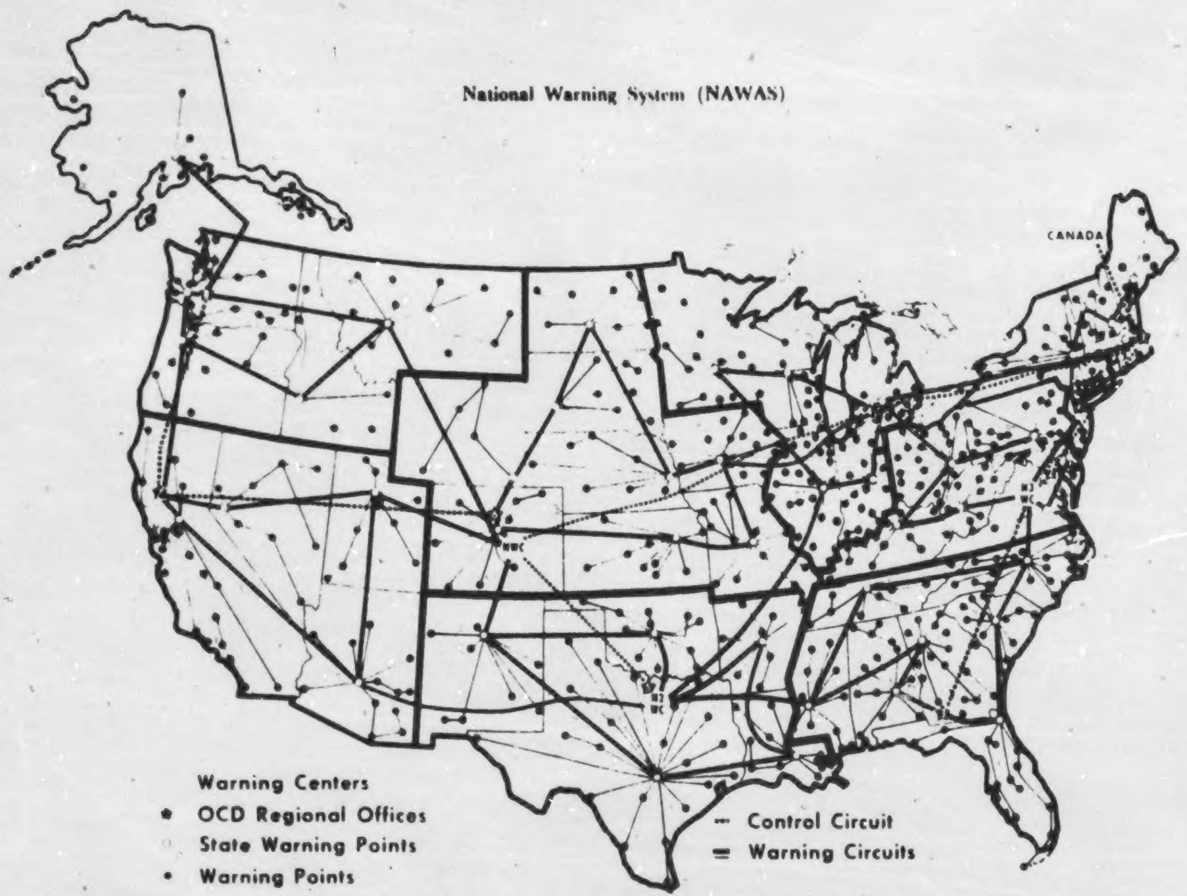
Visual 14

ADJUSTMENTS TO SHELTER LIVING

1. LACK OF FOOD & WATER
2. TEMPERATURE
3. CROWDING
4. LACK OF PRIVACY
5. NOISE LEVEL
6. INABILITY TO CONCENTRATE
7. SLEEPING DIFFICULTY
8. INADEQUATE SANITATION
9. FOUL SURROUNDINGS
10. INADEQUATE LEADERSHIP
11. CONCERN ABOUT OUTSIDE

Visual 15

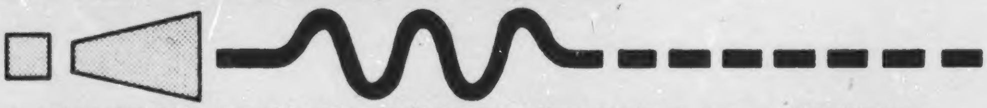
National Warning System (NAWAS)


CANADA
NWC
Warning Centers
OCD Regional Offices
State Warning Points
Warning Points
Control Circuit
Warning Circuits

Visual 69

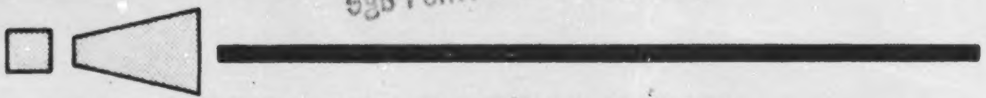
Civil Defense Warning and Alert Signals

THE ATTACK WARNING SIGNAL



A WAVERING TONE OR SHORT BLASTS FOR 3 TO 5 MINUTES -- ACTUAL ATTACK AGAINST THIS COUNTRY HAS BEEN DETECTED -- TAKE PROTECTIVE ACTION IMMEDIATELY !

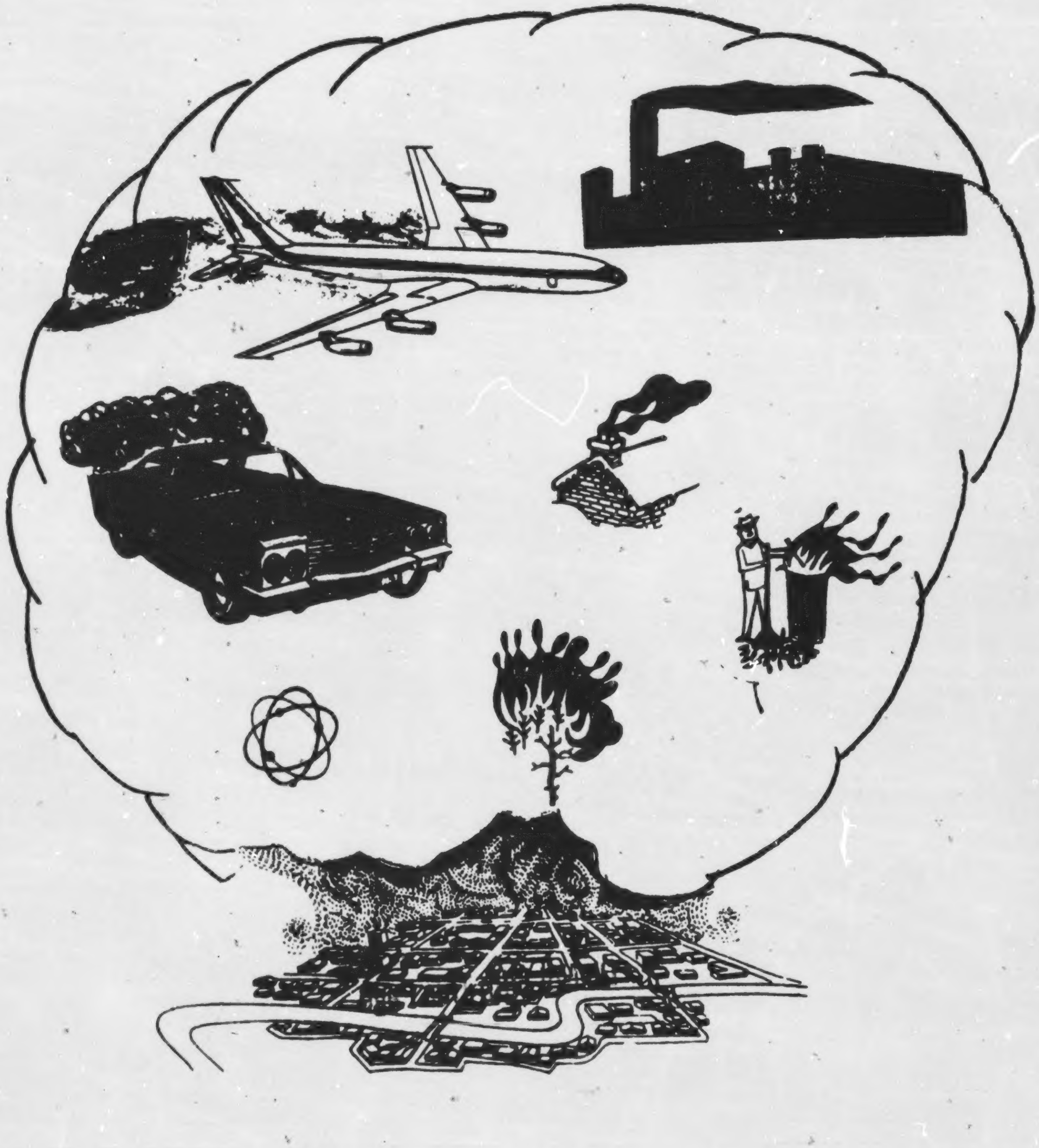
THE ATTENTION OR ALERT SIGNAL



A STEADY BLAST OR TONE FOR 3 TO 5 MINUTES -- LISTEN FOR ESSENTIAL EMERGENCY INFORMATION !

Visual 16

CAUSES OF AIR POLLUTION

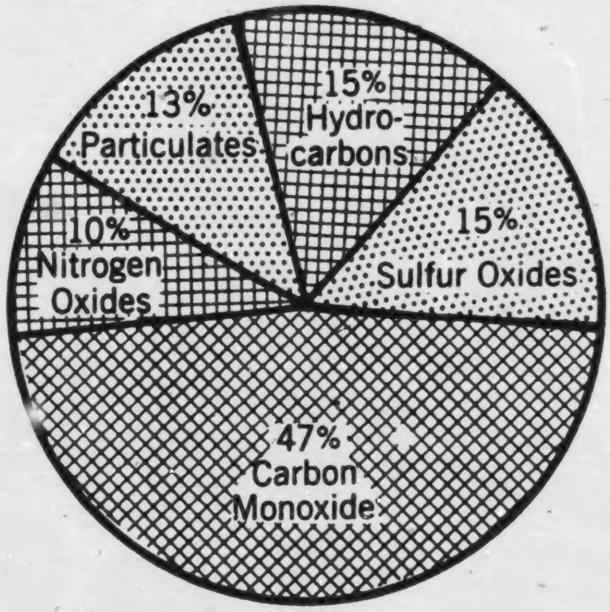


Visual 17

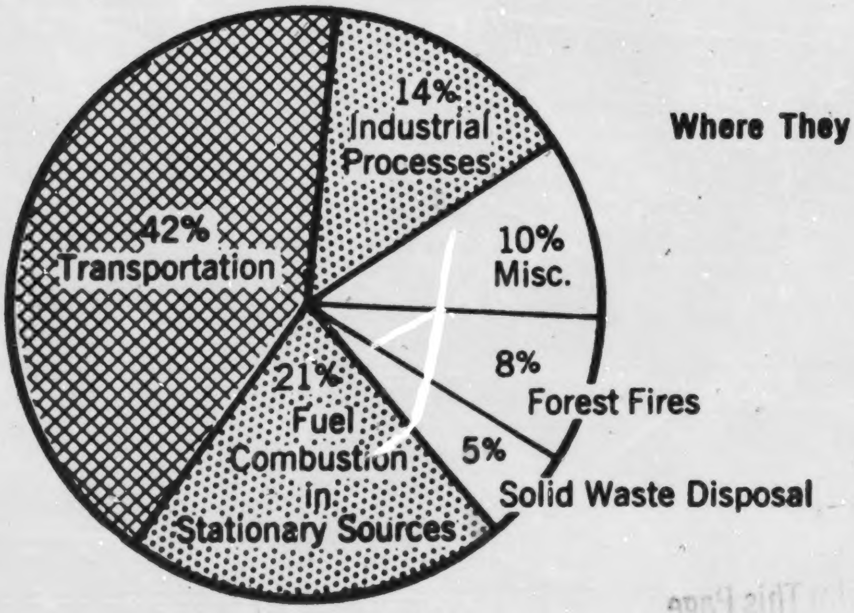
SOURCE: STATISTICAL ABSTRACT OF THE U.S. 1971

AIR POLLUTION EMISSIONS IN THE UNITED STATES

What They Are



Where They Come From



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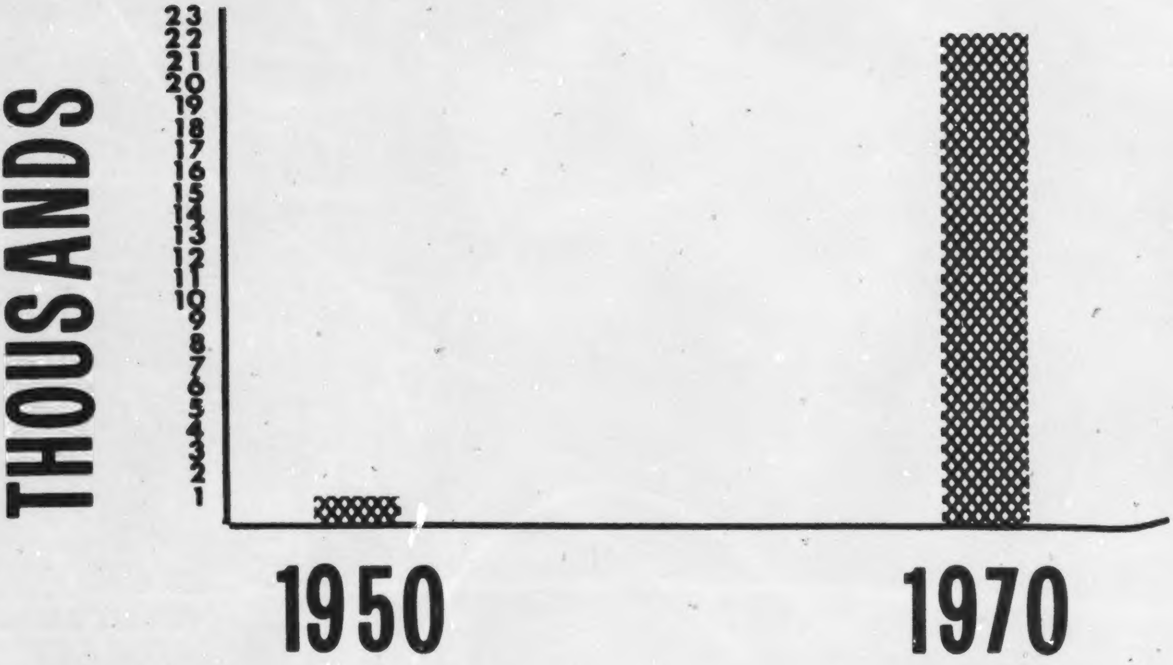
Visual 18

SOURCE: STATISTICAL ABSTRACT OF THE U.S., 1971

PULMONARY EMPHYSEMA

THE 22,670 DEATHS FROM EMPHYSEMA REFLECT A 19 FOLD INCREASE SINCE 1950.

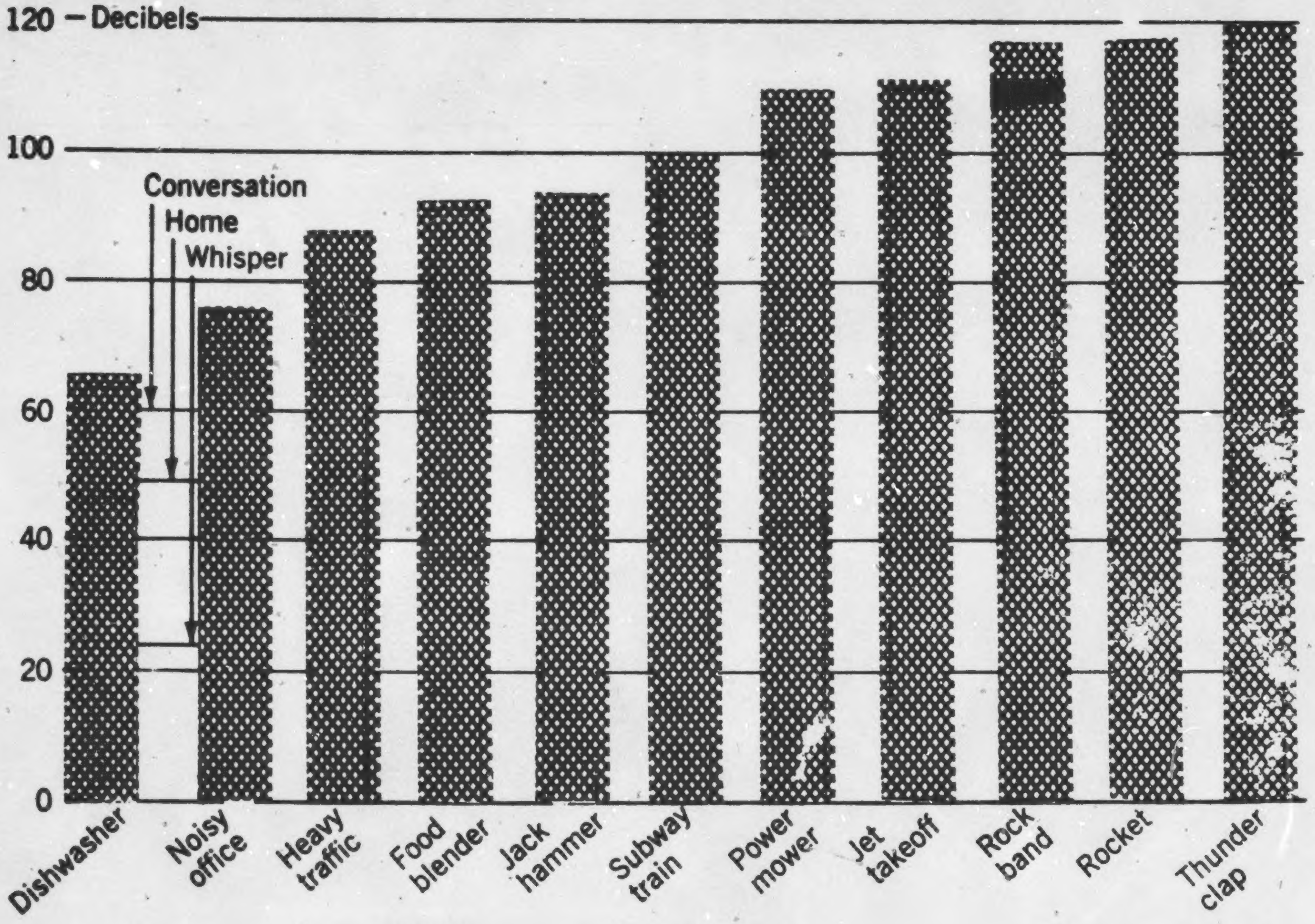


AN AVERAGE OF 1,500 WORKERS A MONTH ARE FORCED TO RETIRE PREMATURELY BECAUSE OF EMPHYSEMA.

Visual 19

SOURCE: AIR POLLUTION PRIMER - NATIONAL T.B. & RESPIRATORY DISEASE ASSOCIATION

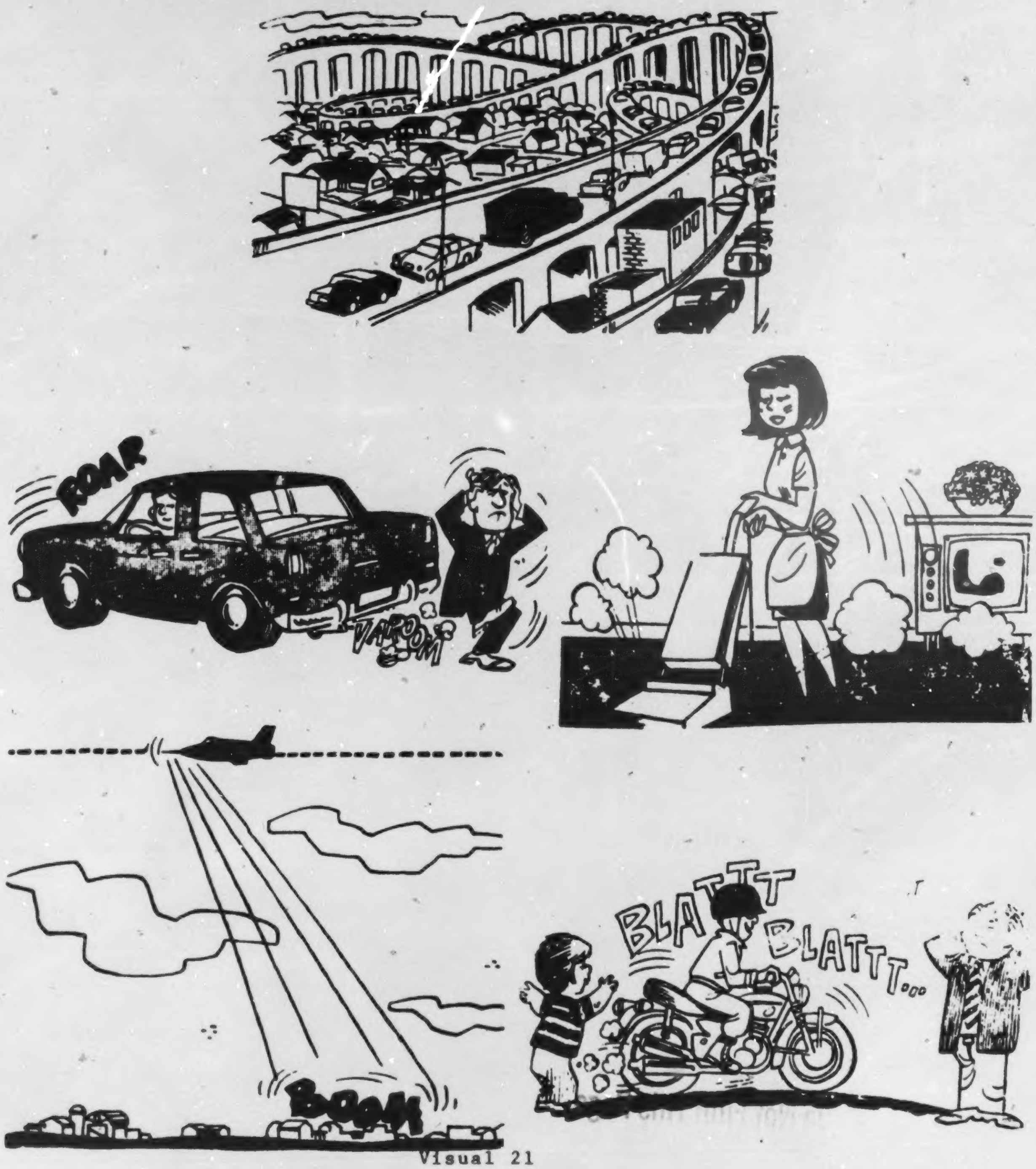
COMMON SOUND LEVELS



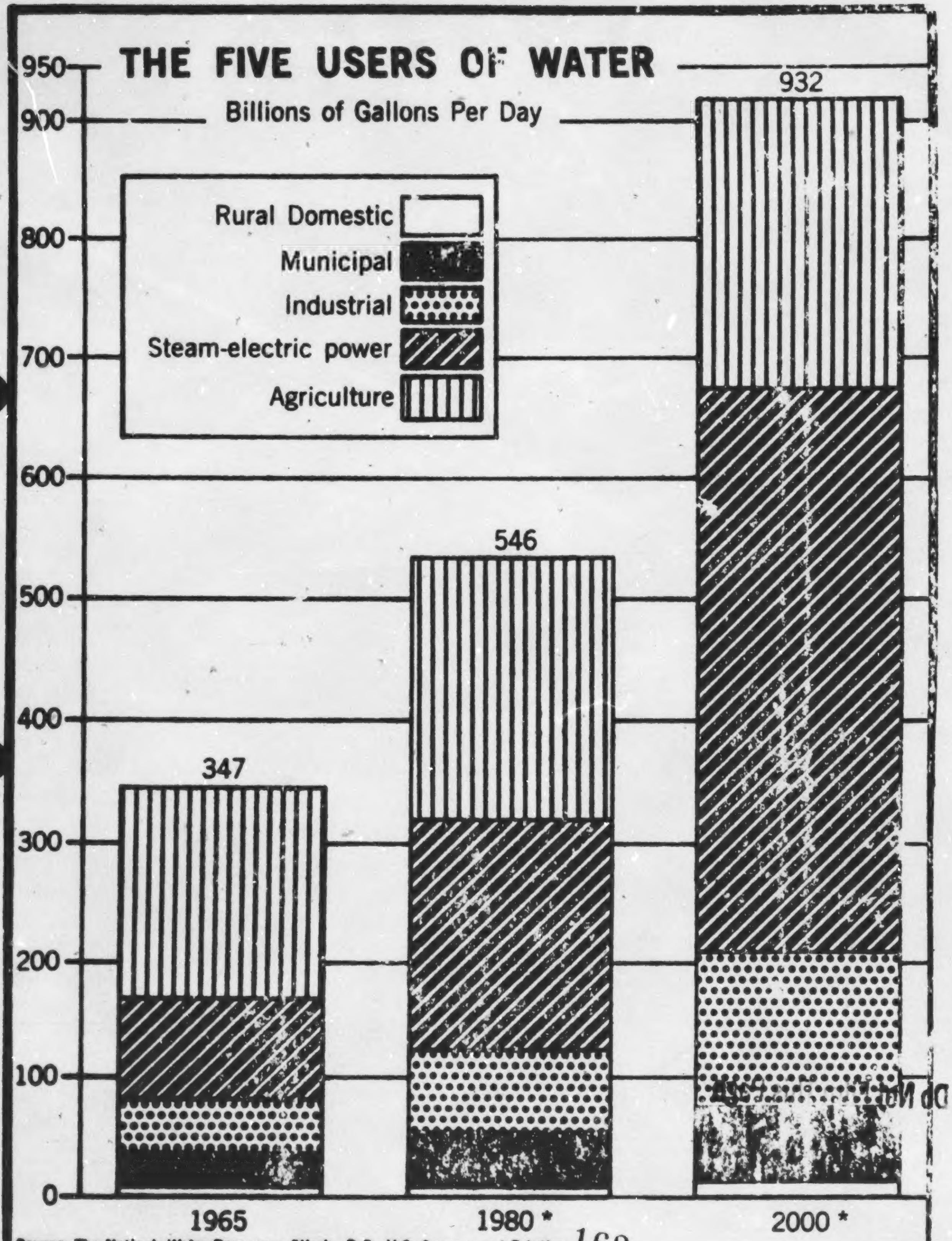
Visual 20

SOURCE: HANDBOOK OF NOISE CONTROL, NEW YORK, AND OTHERS

SOURCES OF NOISE POLLUTION


ROAR
VAROOM
BOOM
BLATTT
BLATTT...

Visual 21



Source: The Nation's Water Resources (Wash., D.C.: U.S. Government Printing Office, 1968)

* projected requirements

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Visual 22

CONSUMPTION OF WATER IN THE CONTEMPORARY U. S. HOUSEHOLD

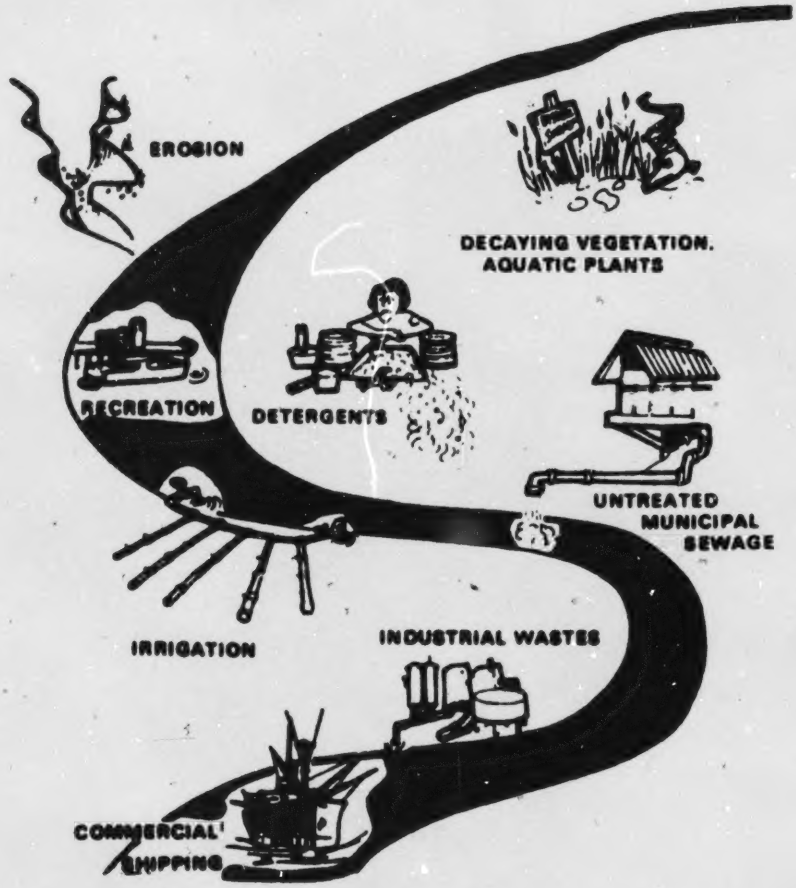
Use	Amount (gallons/per capita/day)
Flushing toilets	20.5
Washing and bathing	18.5
Kitchen use	3.0
Drinking water	2.5
Washing clothes	2.0
General household cleansing	1.5
Watering the garden	1.5
Washing the car	0.5
One faucet drip	12.0
One toilet bowl leak	60.0

SOURCE: AMERICAN WATER WORKS ASSOCIATION

Visual 23

SOURCE: AMERICAN WATER WORKS ASSOCIATION

Causes of Water Pollution


EROSION
DECAYING VEGETATION, AQUATIC PLANTS
RECREATION
DETERGENTS
UNTREATED MUNICIPAL SEWAGE
IRRIGATION
INDUSTRIAL WASTES
COMMERCIAL SHIPPING

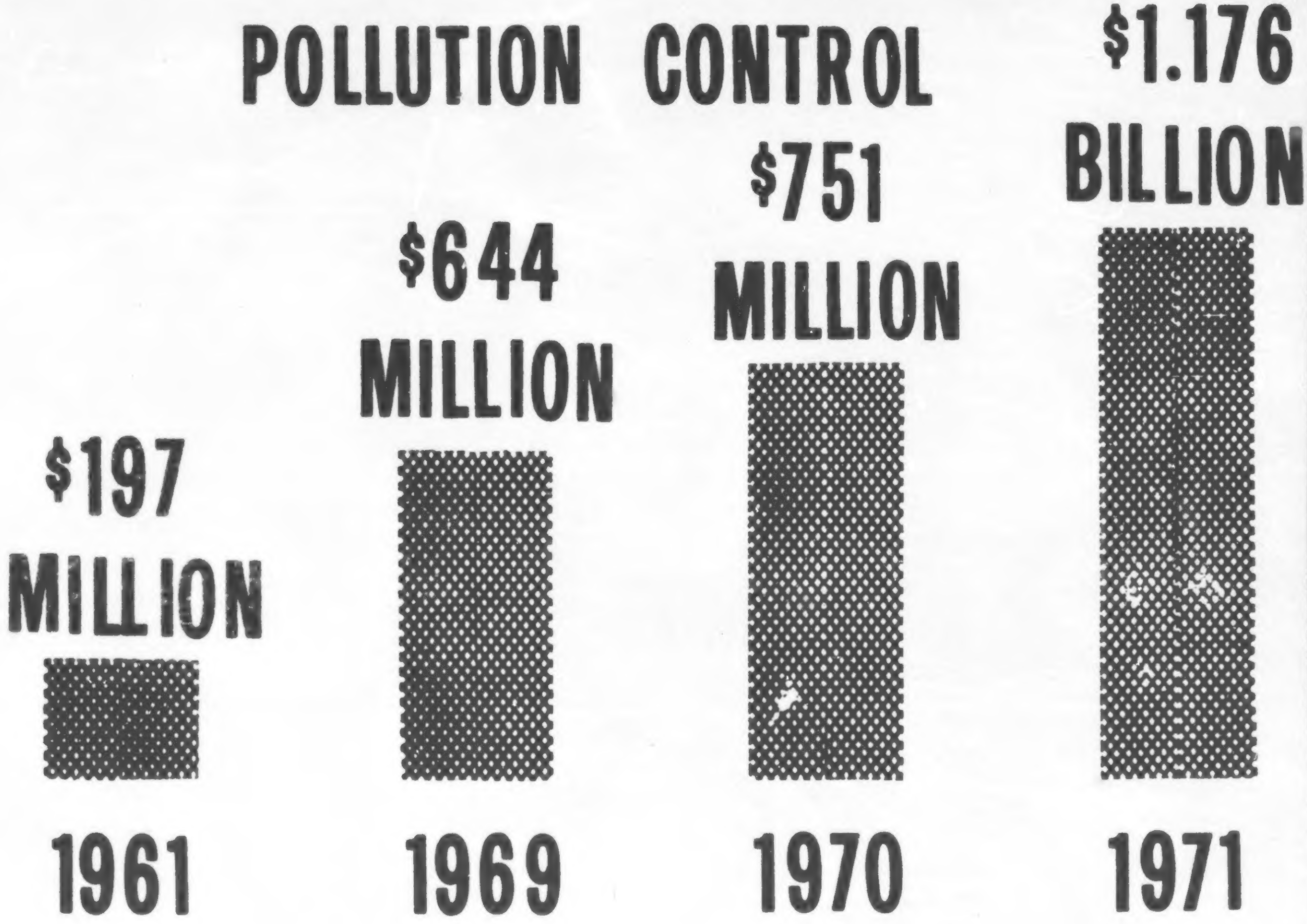
Visual 2164

SOURCES OF WATER POLLUTION

1. SEWAGE
2. CARCINOGENIC & OTHER HARMFUL CHEMICALS
3. HEAT
4. OIL
5. DETERGENTS
6. FERTILIZERS
7. RADIOACTIVE MATERIAL

Visual 25

U.S. GOVERNMENT SPENDING FOR POLLUTION CONTROL



Visual 26

SOURCE: STATISTICAL ABSTRACT OF THE U.S., 1971, GOVERNMENT PRINTING OFFICE